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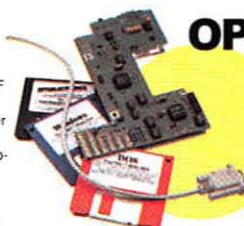


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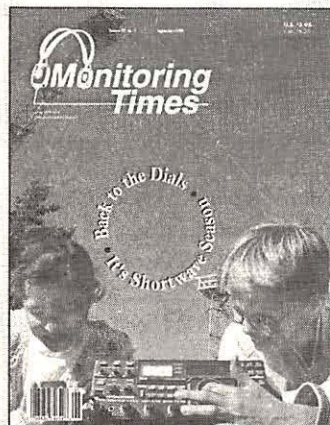
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Cover Story

The Happy Hobbyist

By Ron Perron

As the shortwave bands are opening up, so are the eyes of this fairly recent convert to shortwave listening. This is not an HF bandscan in the strict sense of the word, but more like a scan of the author's journey into the shortwave spectrum. If you're not into shortwave listening already, the author's enthusiasm will make you anxious to start — and conditions were never better! Story starts on page 8.

Our cover photo is of two 12-year-olds from Stockholm, Sweden, Sonja and Gabriel, "listening to shortwave broadcast transmissions using the general coverage receiver built in the ICOM IC751A transceiver," says photographer Henryk Kotoviski, SM0JHF. ("They are tempted to use the microphone — but they are not allowed.")

Cover by John Bailey

CONTENTS

Zambia's Christian Voice 12

By Colin Miller

The first independent radio station in Zambia (the former Northern Rhodesia) began broadcasting on shortwave at the end of 1994. Radio Christian Voice is the project of Christian Vision, a nondenominational and international charity board based in Britain. Radio Christian Voice demonstrates a rather unusual degree of cooperation between government and religion, but Zambia is a rather unusual country.



China Radio International 16

By Valter Aguiar



Everything China does is done in a big way, says the author, and China Radio International is no exception. In an era when other governments are cutting back on broadcasting, China is just now reaping the fruit of a decade of investment into its "bridge to the world." The author was privileged to visit CRI's new facilities firsthand.

Take a Shortwave DXpedition 20

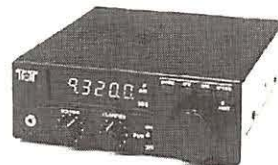
By Hans Johnson

In the never-ending search for more distant signals (DX), the hobbyist will find it of benefit to change his base of operations — in other words, go on a DXpedition.

The Ten-Tec Shortwave Receiver Kit 22

By Mike Bryson

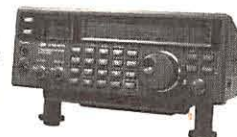
If you thought nothing serious could come in a kit, think again. The Ten-Tec SSB-CW AM receiver kit is about a 25-hour project, divided into logical phases which can be tested every step of the way. The result is a decent receiver at a real bargain — if you know what you're doing.



Reviews:



The Motorola TalkAbout Plus FRS transceiver delivers first-rate performance and exceptionally loud audio says Elliott (p.71); plus it's fun! "Truly a sight for sore eyes!" says Skip Arey of the MFJ Giant Display clock (p.85) Magne says AOR clearly tried to make the AR5000+3 a stronger contender on shortwave than most DC-to-daylight receivers ... with partial success (p.89).





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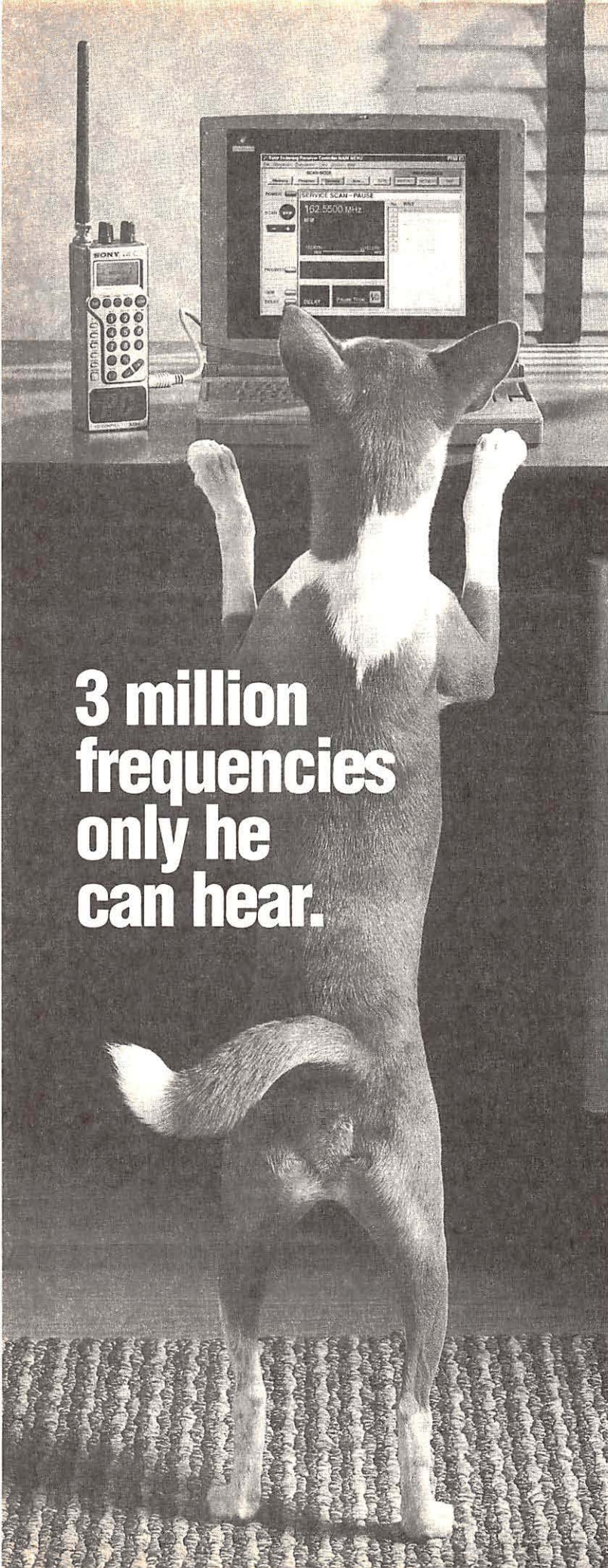
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SONY

By Fred Maia, W5YI
fmaia@internetMCI.com

Free Radio Berkeley Unplugged

On June 16, U.S. District Court Judge Claudia Wilken (Northern District, California) issued a permanent injunction against Stephen P. Dunifer from broadcasting without a license. The 18-page decision reaffirms the Federal Communications Commission's authority to require a license before any person can broadcast on the public airwaves.

Dunifer, a broadcast engineer, had operated the community FM station Free Radio Berkeley (FRB) on 104.1 MHz since 1993, without paying a \$20,000 fine imposed by the FCC for unlicensed operation. The station left the air after the judge issued her injunction.

Dunifer supports himself by assembling and shipping backpack-sized radio kits around the globe. The kits enable people to broadcast for as little as \$1,000 plus the monthly power bill — without a license, of course. One of his customers is the United Nations. Dunifer fostered a "micro radio" movement of unauthorized stations, more than 200 of which have been shut down by the FCC in the last two years.

FCC Chairman William Kennard, who has publicly conceded some sympathy for small, low-power broadcasters, hailed the "decisive court action" that "puts to rest any doubts about the FCC's authority to manage the public airwaves to prevent interference and protect the public's safety." The injunction, he said, "should send a message to all pirate broadcasters: obey the law — and join the FCC in our efforts to expand the legal uses of the public airwaves."

(His latter comment is peculiar, because the FCC has not proposed to expand micro radio broadcasting nor to make it legal. It has expanded the flexibility of licensees in other services, but they have paid billions of dollars at spectrum auctions. The FCC has proposed to also auction radio and TV broadcast licenses.)

The Commission sought an injunction against Dunifer in 1995. Judge Wilken denied the FCC request at that time so that the court could later address Dunifer's complaints that the FCC's licensing policies are unconstitutional. FRB continued to broadcast until the injunction was issued. Dunifer has defied the FCC because he claims their regulations

against micro-power radio broadcasting deny citizens access to a resource they are supposed to own — the airwaves.

"Psychologically, her denial of an injunction at that time was seen as an umbrella that protected micro stations and permitted them to continue," according to Philip Tymon of the Committee on Democratic Communications of the National Lawyers Guild. "That umbrella is no longer there. But I doubt that the micro stations have gone away forever," he said. His committee has supported legal work on behalf of FRB.

Much of Dunifer's case concerned the FCC's so-called "Class D regulations," which formerly recognized a legal class of low-power (10 W) non-commercial educational FM stations.

Many university radio stations held these licenses, but the FCC later stopped granting and renewing the licenses when it decided that they inhibited full-power FM frequency assignments. The low-power stations, the FCC said, could not be allowed to "function in a manner which defeats the opportunity for other more efficient operations which could serve larger areas, and bring effective non-commercial educational radio service to many who now lack it."

The judge's decision turned on several intricate legal arguments. For example, she concluded that because Dunifer had not asked the FCC for a license, or a waiver of the regulations against a Class D license, that the FCC's regulations had not been applied to him and therefore "he does not have standing to challenge those regulations." The judge found that the FCC's regulatory scheme "withstands constitutional scrutiny" because it specifies procedures for the FCC to follow and provides for judicial review of any improper FCC ruling.

The ordering clause of the judge's opinion states: "The United States motion for summary judgment must be GRANTED. Accordingly, Mr. Dunifer, and all persons in active concert or participation with him, are hereby ENJOINED:

- (a) From making radio transmissions within the United States unless and until they first obtain a license from

the FCC;

- (b) From doing any act, whether direct or indirect, to cause unlicensed radio transmissions or to enable such radio transmissions to occur."

Stephen Dunifer's reaction was defiant. "My attorneys, Luke Hiken and Alan Hopper, will be filing a motion to challenge this extremely flawed ruling which insists that one must, first, take part in an obviously futile process before constitutional standing can be established," he said. "For 64 years, the FCC has stood for the protection of corporate interests and profit, not the First Amendment. To hell with the FCC, National Association of Broadcasters, and corporate control. We are going to reclaim our rights and resources through an ever-increasing campaign of electronic civil disobedience and direct action. Free speech by any means necessary. No retreat, no surrender."

Meanwhile, the FCC continues to shut down unlicensed broadcast stations. On June 22nd, FCC agents and U.S. Marshals seized the equipment of WPPR (West Philadelphia Pirate Radio) after several attempts to have the station operator voluntarily discontinue transmission. About 112 microbroadcasters still remain on the air. More than 40 of those are operating in South Florida.

The Price of Vanity

In a stunning reversal of previous policy, the FCC is in the process of reducing the Regulatory Fee associated with the issuance of a "Vanity" amateur station call sign. In MD Docket No. 98-36, the FCC's Office of Managing Director said that it would be reducing the cost of an amateur Vanity station call sign from an annual charge of \$5 to \$1.29! That means the current \$50 cost for a full ten year license term Vanity call sign will be reduced to \$12.90.

Historically, the new fees for vanity call signs go into effect in September. Unless something changes — and we doubt that it will — amateurs will want to consider waiting until September to get that spanking new call sign!

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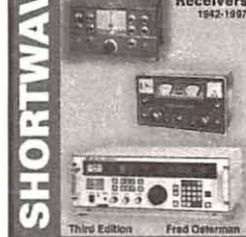
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ARRL Proposes Sweeping Changes

During the annual Amateur Radio Relay League (ARRL) Board of Directors meeting held July 16-18 in Rocky Hill, Connecticut, the directors agreed to propose a simplified amateur license structure with only four classes. Under the League proposal there would only be four written examination elements instead of the present five, and two Morse code examination elements (5 and 12 wpm) instead of the present three.

Under the new plan, the entry level license for ham radio would be known as Class D and would convey the same privileges as the current no-code Technician license. All no-code hams would be converted to Class D licenses.

All amateurs now licensed as General, Technician Plus, and Novice would be converted to the Class C license, carrying the same privileges as the current General class license. To upgrade from Class D to Class C an amateur would have to pass a written exam and five word per minute Morse code examination. Expanded phone band privileges in the 80, 40, and 15 meter bands would be available since Novice CW bands would no longer be required.

The third step would be known as Class B, equal to the present Advanced class license. To

move from Class C to Class B, an amateur would pass a more advanced written exam and a 12 word per minute Morse code examination.

The final license grade would be Class A and it would convey the full privileges of the present Amateur Extra Class. To upgrade from Class B to Class A, a ham would be required to pass the most difficult written exam of the license elements. But the Morse code requirement would be capped at 12 words per minute, consistent with the practice observed in many other countries around the world.

Following the meeting, ARRL President Rod Stafford, W6ROD, said, "The debate was at times contentious and the result was not unanimous. Some Board members preferred greater simplification; others were uncomfortable with some of the changes being proposed. However, every Board member, without exception, left the meeting knowing that each of his or her colleagues did what they believed was in the best interest for the future of amateur radio."

Nine of the 15 League Directors voted in favor of the plan, with six opposed. The new changes must still be approved by the Federal Communications Commission.

Electra going, going, gone

Doug Robertson spied this notice in the classifieds: "In the US District Court for the



Southern District of Georgia, Savannah Division... Notice of Marshal's Sale of Tug Electra. Vessel Particulars: Offshore Radio Broadcast Station Tug 'Electra' ... The Tug 'Electra' is [a] tow boat fitted with a complete radio broadcast station, including radio tower ... Will be sold 'As Is, Where Is' ... at public auction on the 15th day of July 1998 ... to the highest bidder..."

The *Electra* was outfitted as a radio ship by Alan Weiner for Scott Becker of Lightwave Mission Broadcasting. According to the online Pirate Pages it left Boston in March headed for the Caribbean but was forced to stop in Savannah for repairs. Information from the Numero Uno DX group says the repairs were necessitated by a collision with another vessel, and between repairs and lawsuits, the preacher funding the project ran out of money. Weiner and Becker had already moved on to other projects, when yet another broadcasting ship went down to history.

BULLETIN BOARD

Sept 12: Monroe, NC

Union Co ARC Hamfest & Computer Fair at the National Guard Armory, Monroe. Talk-in 145.39(-) and 444.425(+), 8a.m.-4p.m. \$4 admission. Walk-in VE testing. Peggy Knight N4MMM, (704) 764-7279, peggy33@hotmail.com

Sept 19 - 20: Air Force Anniversary QSO

On-air gathering of active and former members of the Air Force. See <http://ourworld.compuserve.com/homepages/k5xs>. Encourages operation on frequencies ending in "47" to celebrate 1947, the year of the formation of the Air Force as a separate service. Sponsored by Razorback Radio Club, 604 Julian Avenue, Honolulu, HI 96818, e-mail k5hog@aol.com or k5xs@compuserve.com

Sept 19-20: Anchorage, AK

Alaska State Convention, sponsored by Anchorage ARC, PO Box 101987, Anchorage, AK 99510-1987 rlment@alaska.net. \$3 admission.

Sept 19-20: Albuquerque area, NM

1998 Duke City Hamfest will be held at the National Guard Armory in Rio Rancho, in the greater Albuquerque area. Sat, 8am-5pm; Sun, 8am-1pm. Website: <http://www.qsl.net/dchf>, dchf@qsl.net. Contact: Richie Allen KC5NZR 505-242-0208 E-Mail: KC5NZR@rt66.com

Sept 20: Lenawee, MI

Adrian ARC of Adrian, 26th Annual Hamfest and Computer Show at the Lenawee County Fairgrounds. VE Testing, hourly prizes. Camping available. Starts at 8 a.m. Contact Brian, KG8CO at kg8co@lni.net or visit the AARC web page at: www.lni.net/~w8tqe

Sept 20: Hazlet, NJ

Garden State Hamfest at Veteran's Park (GSP exit 117, Rt 36 east, right onto Middle Rd, right onto Greenacre Rd.). Talk-in 145.485 (-6), 224.96 (-1.6). \$5 admission, 8am. VE testing, prizes. Jack Petro KB2GJU 732-681-5994; www.monmouth.com/~gsara or gsara@monmouth.com

Sept 20: Newtown, CT

Western CT Hamfest, Candlewood ARA/Ken Weith-KD1DD, Box 3441, Danbury, CT 06813-3441 (203) 743-9181. Talk-in 147.12/.72, Set-up 7a.m., public 9a.m.-2p.m. Admission \$4, tables \$10, tailgating \$6.

Sept 26: Trenton, NJ, area

Fall Fest 98 at the Tall Cedars of Lebanon picnic grove, Sawmill Rd, Hamilton Twp, NJ. Talk-in 146.67(-) 8a.m., admission \$5. More info call 609-882-2240 or www.slac.com/w2zq

Sept 27: Springfield, OH

The Independent Radio Assoc is holding the 16th annual hamfest and computer show at the Clark County Fairgrounds, I-70 to Exit 59, north 1/4 mile on SR 41. Talk-in 145.45 (-), 8a.m.-3p.m., \$5 admission. All indoors.

Radio Free Asia buys KHBI

The government-funded shortwave broadcast station Radio Free Asia has announced an agreement to buy broadcast facilities in Saipan belonging to the Herald Broadcasting Syndicate (a subsidiary of The First Church of Christ, Scientist). The agreement includes broadcasting time for some HBS programs to continue.

Richard Richter, President of RFA, stressed, "KHBI is a well-run, effectively located station. It will serve us well as we undertake to expand our broadcasting to help meet the pent-up demand for unbiased reporting of events in Asia."

Herald Broadcasting still retains its South Carolina station, WSHB, and says the sale will enable the church to focus on the editorial side of programming instead of distribution.

VOA's Africa Service Gears Up

Call it Radio Democracy for Africa or a beefed-up African division of the Voice of America, the service to Africa proposed by President Clinton last April is beginning to take shape. Programming will be geared toward civic issues such as conflict resolution, democracy, politics, and human rights in Africa, and the number of languages will be expanded for some "under-served" areas of the continent.

Programs will be delivered in the same way as VOA broadcasts: to Africa by satellite and rebroadcast by shortwave and mediumwave networks, and the number of hours beefed up from VOA's current 90 hours to more than 100 hours per week over a three-year period.

RNZI Experiences Drastic Cuts

The New Zealand Ministry of Foreign Affairs has mandated cutbacks in Radio New Zealand International's broadcasting output. RNZI's evening broadcasts will be dropped and replaced by the domestic program. Daily broadcasting output prepared for audiences in the South Pacific will be reduced from 11 to 5 hours. All Pacific Island indigenous languages will be cut. The station's personnel have been cut to a staff filling nine full-time positions.

The Chief Executive of Radio New Zealand, Sharon Crosbie, says she is sad and frustrated by the cuts to such a valuable service. She says RNZI's coverage of regional issues has contributed much to New Zealand's increased understanding of its part of the world.

Catholic Radio Network

Father Joseph Fessio says that out of perhaps 1,800 religious stations in the U.S., "only 10 or 15 at the most are Catholic." There have been a few efforts to establish independent Catholic radio sta-



tions using the satellite uplink facilities of Mother Angelica's Eternal Word Network, but Father Fessio concluded a significant airtime presence could not be established through donations.

"Why not set up a for-profit company and get investors to put up money to purchase stations and have a voice?" he asked ... and he has done just that. Catholic Radio Networks has an agreement to purchase ten stations from Children's Broadcasting Corp., but CRN still needs \$70 million in investments before Catholic talk radio can become reality this September.

Taking the Smart Bus to School

For rural children headed back to school a problem is that they can often be exposed to inclement or dangerous conditions while waiting for the school bus. A new solution to this problem is BusCall.

"BusCall marks the first location application that uses cellular control channel messaging," says Ed Comer of BellSouth. BellSouth's Cellemetry Data Service enables a variety of equipment to be remotely monitored using the existing network's control channels. In this case, Global Positioning System satellites establish the location of each school bus. Cellemetry Data monitors the bus' progress, and BusCall's messaging system notifies the family by ringing the home telephone with a distinctive ring. When answered, the parent or child hears, "School bus number 44 will be arriving at your bus stop in 5 minutes and 21 seconds."

BusCall (developed by Global Research Systems) had its first test last year in Bimidi, Minnesota.

FCC Sits on Pandora's Box

Last year the FCC carved the land-mobile service into two pools of frequencies: one for public safety and government agencies and ambulance services, and the other for business and industrial use. The latter pool includes around 5,140 frequencies to be assigned on a first-come, first-served basis.

The American Automobile Association has petitioned the FCC to at least retain control over the group of 43 channels it has been using for over 40 years. "We do a road-service call every five seconds," said Gary Ruark, AAA's frequency coordinator. "We don't have the capacity to share with anyone else."

According to the *Washington Post* story, the FCC isn't anxious to open Pandora's box, since taxis, truckers and others have also asked for reconsideration.

"Communications" is compiled by Rachel Baughn with help from the following fine communications team: Anonymous, NY; David Alpert, NJ; Mark Ansel, MI; Richard Ashley, TX; Ed Cichorek, NJ; Perry Crabill, VA; David Doan, FL; Kevin Klein, WI; Bob Mills, CA; Doug Robertson, CA; Steven Schauer, OH; Doug Robertson, CA; Tim Roske, NY; Richard Sklar, WA; Walter Szczepaniak, PA; Robt Thomas, CT; Larry Van Horn, NC; George Zeller, OH.

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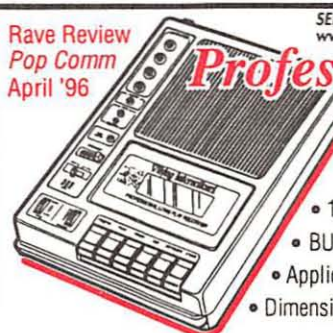
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It's a thrill to listen to AWACS aircraft as they perform air defense exercises over the Atlantic. (USAF photo by Master Sgt Dave Nolan)

The Happy Hobbyist

An HF Band Scan

By Ronald A. Perron

You could say that I got into shortwave listening through the side door.

For a while now I've been into VHF scanning — or perhaps I should say I've been HOOKED into VHF scanning. I bought a Radio Shack PRO-2045 and used the telescoping antenna that came with it. I had so much fun with this scanner and I wanted to find out more about the hobby. So I subscribed to *Monitoring Times* and started surfing some of the scanner groups on the InterNet.



The author's "cozy" listening post of a PRO-2045, ATS 909 and "the ever-present WRTH."

With my interest now piqued, I convinced my wife that although my equipment was only a few months old it was time to upgrade. I bought a Diamond Discone antenna and put that up in my attic. That has really expanded my VHF/UHF world.

While learning more about scanners, etc., I started reading some of the articles on short-wave listening and realized that there is a lot of activity out there in the HF spectrum. I was under the impression that this activity had dried up with the advent of new technologies, satellites, etc. I was wrong.

I wondered what was out there in the SW world? Would it be as interesting as the VHF world? I started looking into some of the equipment.

The cautious approach

I figured I'd start out economically just in case it wasn't as interesting for me as the scanner world. I bought a Sangean ATS 909 and used the wire rollout antenna they provided. Boy, was I surprised! That little antenna provided some very good reception.

One of the first stations I found right out of the package was the US Coast Guard's Communications Master Station Atlantic (CAMSLANT) Chesapeake on 5.696 MHz. He was booming in. As luck would have it I caught him in the middle of a rescue operation involving an HC-130, an HH-60 helicopter, and a cutter. Some pretty exciting stuff right in the middle of one of our winter Nor'easters here on the East Coast.

Needless to say, after a few days of searching around the bands I was hooked for good. I used that little wire antenna for a couple of months, stringing it out every time I wanted to listen and reeling it back in when I was done. Leaving the wire permanently strung out over the bookcase and curtain rods in my "radio room," which is also the family computer room, wasn't an option. Just a little too unsightly.

I knew that I just had to expand my listening range so I started looking into more equipment. I started using that dreaded word "upgrade" again. (You can see there's a pattern developing here, isn't there?) I wanted to start with the antenna, realizing that this was the

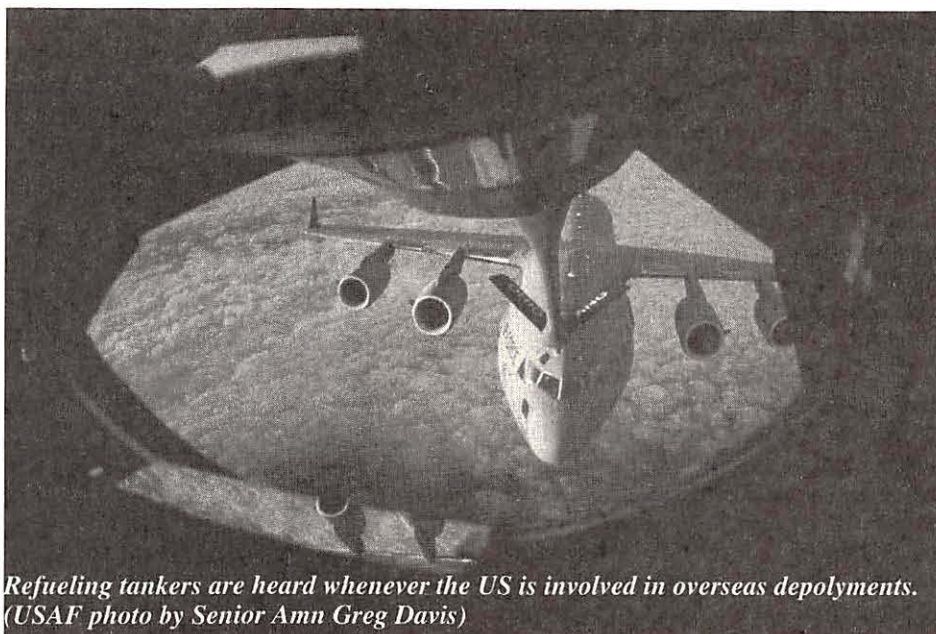
most important aspect of any radio system.

Stringing a large dipole outside wasn't an option. So I did a little research, talked with some of the technical folks at Grove and decided to go with a Skywire, which I strung in my attic. The wire was longer than my attic space so I had to improvise a configuration. Not being a technical type, I figured that a parallelogram, roughly box shaped, would give me the best overall reception coverage. It may or may not be the optimum shape, but it sure has expanded the world of shortwave for me.

Looking from above the antenna looks like the sketch below. It's oriented roughly east to west. The long portion is about 34 ft. long, the end portions about 9 ft. long and the short sides about 10 ft. each. It's located about 25 ft. above the ground on a horizontal plane.

Using this antenna, I've logged the US Air

Line drawing of author's antenna configuration



Refueling tankers are heard whenever the US is involved in overseas depolyments. (USAF photo by Senior Amn Greg Davis)

Force Global HF System (GHFS) stations at Hickam (Hawaii) and Elmendorf (Alaska), as well as Thule (Greenland), Ascension Island, Croughton (England), and Incirlik (Turkey).

I've also logged civilian air traffic control-

lers in Egypt, Sudan, Libya and Kenya. Southward my range extends down to Brazil, Venezuela, Colombia, and Mexico and the Caribbean. So reception is pretty good from my location in eastern Maryland.

Talk radio? Rush and Art never sounded so good!

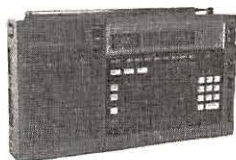
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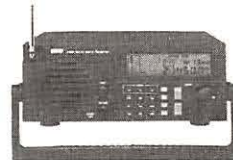


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Boring? Routine? Never!

My main shortwave listening interest continues to be military communications, and I'm continually surprised at the variety of interesting loggings out there. During last winter's buildup of forces in the Persian Gulf to counter old Saddam, the GHFS was buzzing with loads of traffic. There were loggings aplenty of Reach transports and refueling tankers ferrying aircraft and personnel back and forth.

For me it's a thrill to tune in on our Airborne Command Posts (Nightwatch) and US Air Force AWACS (Dragnet and Dark Star) aircraft as they perform their airborne patrols and air defense exercises. In several instances I've been able to catch them coordinating their activities on HF and then follow them through the exercise on VHF/UHF. The ocean areas off the Middle Atlantic coast are a major training location for Air Force and Navy.

The US Coast Guard continues to provide some interesting listening, including some exciting search and rescues. The tricky waters off New England and Cape Hatteras keep the Coast Guard hopping.

For a change of pace, there's the Drug Enforcement Agency guys working with the Navy and Coast Guard to keep watch over the Caribbean. They are usually good for one or two exciting boat chases every month or so.

Maybe it's my location here in the northeast, but I get fairly good reception on Canadian Forces and Coast Guard activities from Trenton, Ontario, and Halifax, Nova Scotia. Every now and then I can also pick up commercial fishing vessels working the George's Banks and New England fishing grounds. They're a little different than your usual utility link and sometimes the conversations can get pretty "salty!"

I started out in the SWL world interested mainly in the utility world. But of late I'm developing an interest in the broadcast world. Reading Gayle Van Horn's articles in *Monitoring Times* has piqued my interest. So I've been trying to see what sort of range I have with my equipment in this area. So far I'm impressed with the variety of listening that's out there. It's opened up a whole new area of shortwave listening for me.

I realize that compared to some of you readers I'm a rookie at this hobby — but I think I'm catching up fast. The dreaded "U" word *upgrade* is creeping into my vocabulary again. I'm longingly eyeing the more sophisticated SW receivers in the catalogs. Boy, if I ever hit the lottery one of the first things I'm

going to buy is a Drake SW8 or maybe an AR7030 and, of course, a Minituner Plus, and

100 ft. of outside wire and.... I guess the list never ends!



Search and rescue operations by the Canadian Coast Guard always provide dramatic listening.

Band Burners

Here are some of my favorite HF utility frequencies. I've included only the ones that are usually fairly active and provide interesting listening:

Freq (MHz)	Identification
4.739	Canadian Forces (Search & Rescue)
5.277	DEA Caribbean/Gulf of Mexico/Atlantic (night primary) - Alpha
5.696	US Coast Guard - CAMSLANT Air to Ground / Search & Rescue Ops
5.717	Canadian Forces (Search & Rescue)
6.501	US Coast Guard stations (vessels on 6.200)
6.694	Canadian Forces - Halifax Military
6.697	US Navy - Emergency Action Messages
6.761	US Air Force (Air-to-air refueling, common)
8.764	US Coast Guard stations (vessels on 8.240)
8.968	US Air Force GHFS (Various)
8.983	US Coast Guard - CAMSLANT Air to Ground / Search & Rescue Ops
8.992	US Air Force GHFS (Various)
8.971	US Navy-Safety of Flight / Drug Interdiction Voice Coordination Net
10.780	US Air Force Cape Radio-Cape Canaveral
11.175	US Air Force GHFS Primary (Various)
11.214	NORAD-Canadian Forces-Trenton Military AWACS (Charlie 6)
11.232	Canadian Forces-Trenton Military
13.257	Canadian Forces-Trenton Military
14.686	DEA Caribbean / Gulf of Mexico / Atlantic (day primary) - Papa

If you're interested in military aircraft there are the Mystic Star "F" and the Stratcom "Z" series frequencies. They're too numerous to list here but you can find them at several places on the Web. I found a good list for these and other military HF frequencies on the Worldwide Utility News (WUN) website at <http://www.gem.net/~berri/wun/newsletter/v4/n05/mla.html>

I also found a good reference listing of HF utility frequencies at Bob Colyard's website at <http://www.cybercomm.net/~slapshot/utelist.html>

For broadcast listening I recommend the old standbys *World Radio & TV Handbook* and *Passport to World Bank Radio* yearly editions. Good Listening!

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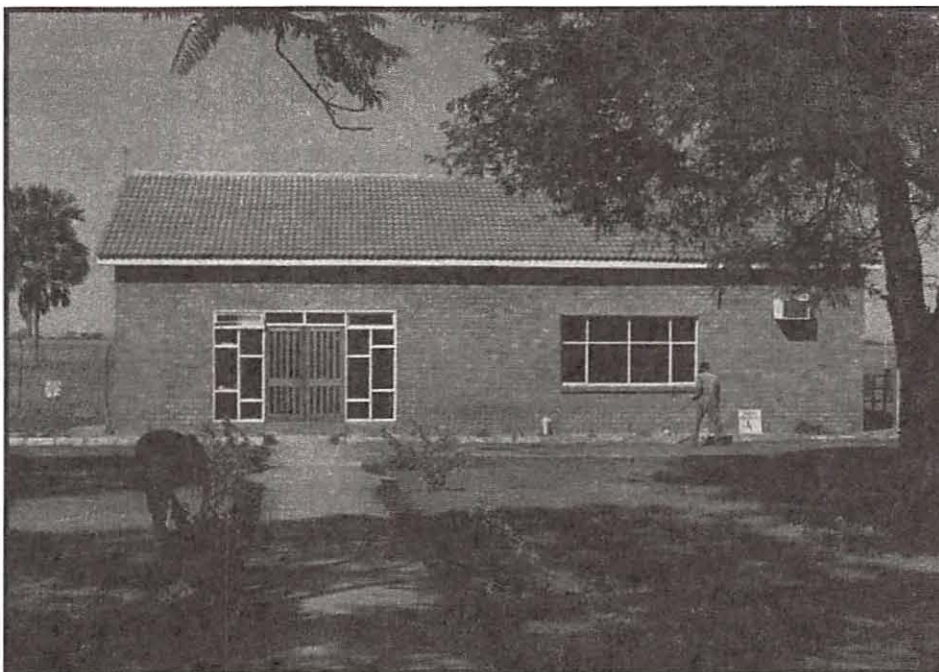
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Zambia's Christian Voice

By Colin Miller



The Radio Christian Voice broadcast building in Zambia.

The last time *Monitoring Times* looked at the African country of Zambia was March of 1990, in which we focussed on its history and the development of broadcasting there. Since then, a number of changes have taken place, among them the setting up of the country's first independent radio station, Radio Christian Voice. Three people in particular, directly or indirectly, had an influence on the establishment of the station: Dr. Livingstone, President Chiluba, and Bob Edminston.

■ The seed is planted

Of Zambia's population of over 9 million, between 50 - 75 % are Christians. The Scottish missionary, doctor, and explorer David Livingstone (1813-1873) journeyed extensively in Central and South Africa. He believed in ending the slave trade and establishing Chris-

tianity and legitimate commerce in its place. In his travels he discovered the mighty Victoria Falls, Zambezi River, and Lake Nyasa (now Lake Malawi). The Victoria Falls is regarded as one of the seven wonders of the world.

In 1866 Livingstone set out to discover the source of the Nile. He traveled along the Rovuma River toward Lake Tanganyika. During this expedition at Ujiji he was met by Henry Morton Stanley, a journalist with the *New York Herald*, who asked the famous question: "Dr. Livingstone, I presume?" They became good friends and explored parts of East Africa together. Livingstone is considered to be one of the most important explorers of Africa; a Zambian town near the Victoria Falls is named after him.

Through exploration Livingstone changed Western attitudes about Africa. People became more involved in the fight to abolish slavery and saw the value in African land. The first European settlers arrived and the country was administered by the British South Africa Company. The slave trade was finally suppressed in 1903.

Then called Northern Rhodesia, the country remained under British rule until it received its independence in 1964, changing its name to Zambia. For more than 27 years, the country was ruled by Kenneth Kaunda. His Christian oriented, socialist humanism became government philosophy. This was a period of social crisis, graphically portrayed by poverty and economic stagnation as a result of almost three decades of politically-inspired decline. In October 1991, the Movement for Multiparty Democracy (MMD) defeated the United National Independence Party (UNIP) with a majority of

4:1 in the nation's first democratic election. Frederick Chiluba, 54, was elected the new President.

Since Chiluba came to power the nation's economy has progressed, inflation has decreased and exchange controls have been relaxed. Privatization has accelerated and changes have been introduced in legislation related to mining, indirect taxation and land.

A "born-again" Christian, President Chiluba belongs to the mainline and often conservative United Church of Zambia, where he is an elder and very active in religious observances. Every Cabinet meeting starts with a word of prayer. To nearly everyone's surprise, in 1992 Chiluba declared Zambia a Christian nation under the leadership of Jesus Christ.

■ Ripe for a Christian Voice

Bob Edminston, a successful British businessman who used his success to found Christian Vision, an international charity board, recognized a potential for partnership when he heard of Chiluba's Christian stance. Christian Vision UK tasked Christian Vision Zambia with the following projects: a radio station, mixed farm, and a Bible College. Christian Voice was launched as the first private station in Zambia on December 1, 1994, by President Chiluba.

The station is located on an 8,000-acre farm, 35 km (22 miles) southwest of Lusaka, the capital city of Zambia, off Kafue Road, the road linking Lusaka to Livingstone. The buildings house the transmitter, generator, studio, production, technical services, canteen, administration and multi-track recording studio. The farm is full of mango and jacaranda trees, and

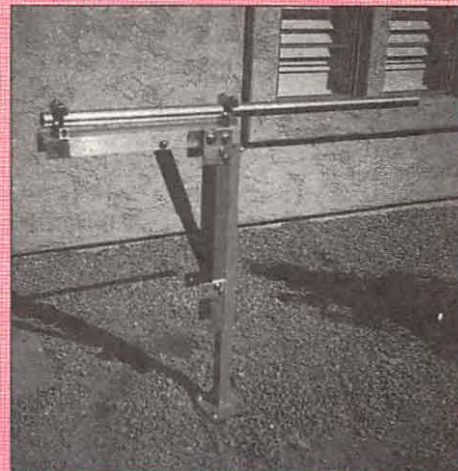
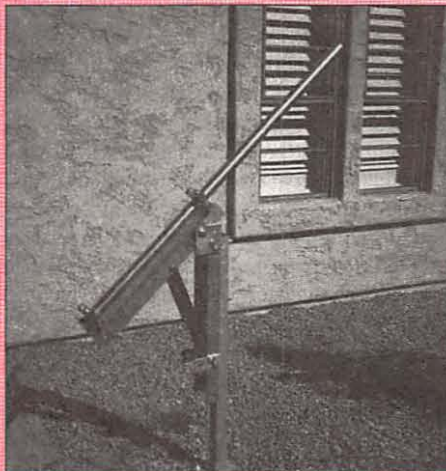
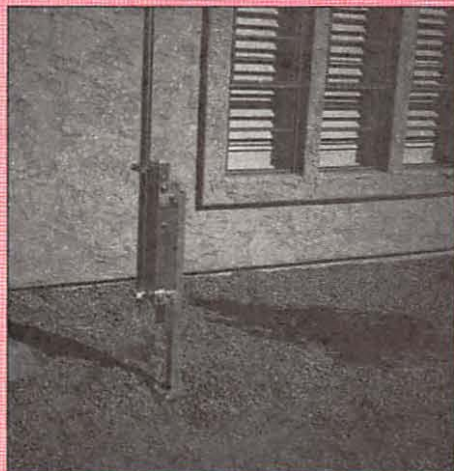


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Model DH-1 in action!

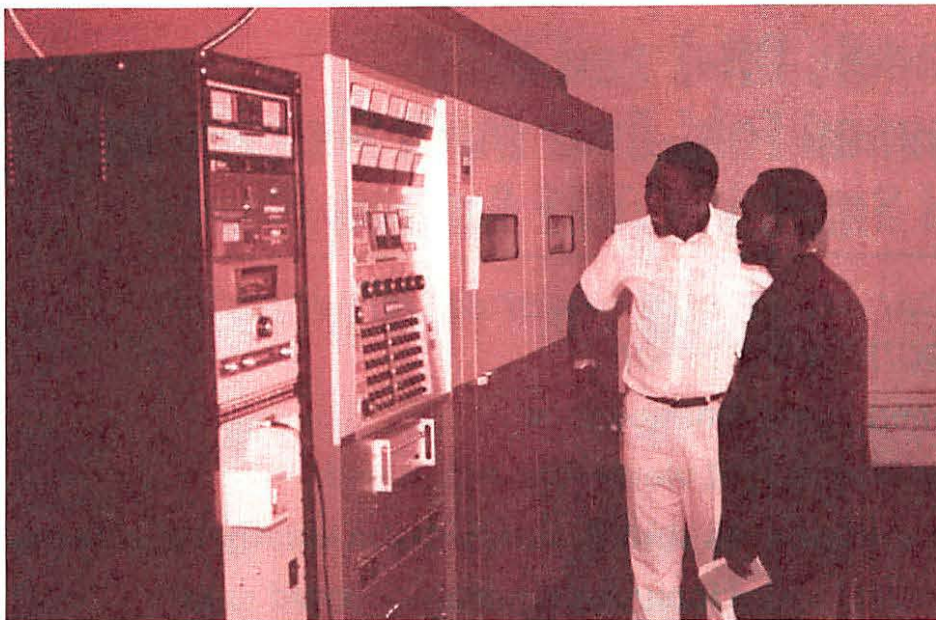
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Acting station manager Charles Maboshe shows a reporter the SW transmitter.

construction is nearing completion. From the site, one looks down over the farm to the Kafue River, which flows into the Zambezi River and into the vast, man-made Lake Kariba.

The shortwave transmitter is a 100 kilowatt Continental 418E with a TCI 615-2 high gain omnidirectional antenna.

The shortwave broadcasts cover Southern and Central Africa from Kampala (Uganda) to Cape Town (South Africa) and from Madagascar to Angola — a potential listening audience of over 100 million people.

According to the Christian Voice website (<http://www.christian-vision.org/>), last winter's schedule was as follows:

0400-1600 UTC on 6065 kHz
1600-2200 UTC on 3330 kHz

Readers may be interested to know Christian Vision has also just launched Voz Cristiana this year from the former Voice of Chile facilities.

Radio Christian Voice is proud of its 16 multi-track recording studio.



■ Local service as well

The FM service for Lusaka was launched by Vice-President Brigadier General Godfrey Miyanda on August 14, 1996. The FM transmission is on the air 24 hours a day on 106.2 MHz stereo. The transmitter is located on the roof of the 5-star Pamodzi Hotel, and covers a radius of 120 km.

As of January 1, 1996, the station launched a 16 track recording console with Q-base facilities at its studios. The staff are proud to say that this facility is the first of its kind in Zambia, and it has so far recorded over 15 albums.

According to *The Post*, Zambia's leading independent newspaper, Radio Christian Voice became the first radio station in Zambia to pay royalties to the writers of music played on their station when they presented the Zambian Copyrights Society (ZAMCOPS) with a substantial check in 1996. Zambia National Broadcasting Corporation (ZNBC) so far had not recognized the artists whose music they played on radio and television by way of paying royalties.

■ Programming

Programming includes Gospel music, Bible teaching, general interest programs such as travel, health and agriculture. Ninety percent of the programs on Christian Voice are produced locally, although they do broadcast some programs produced by Christian ministries abroad. The programs range from Christian teaching to education, agriculture, health and children's interests. In addition, the station runs news head-

lines at the top of the hour, and news bulletins at 1100, 1600, and 2000 UTC (1:00 p.m., 6:00 p.m., and 10:00 p.m. local time).

There are several hours of live broadcasting during each broadcast day. From 0400 to 0700 UTC (6:00 a.m. to 9:00 a.m. local) there is the *Morning Show*, a unique way to start the day, with news, health, Scripture readings, a thought for the day, and of course music. From 0900 to 1130 UTC (11:00 to 2:00 p.m.) Gibbs Mweemba presents *Focus*. Panji Chipeta hosts *Afternoon Magazine* between 1230 and 1430 UTC (2:30 and 4:30 p.m.), guiding listeners through a varied program, including news reports, Christian World news, recipes and entertaining facts.

As the day begins to come to an end, *Celebrate* includes the Good News, the Noticeboard, and the A-Z of Christian music, making the evening start in a wonderfully uplifting way. At 2000 UTC (10:00 p.m.) in *Late Night Extra* Dennis Shamboko helps listeners reflect on the Word of God — the perfect way to end a busy day.

Mofya Phiri sits at the Studio One console.



Because Christian Voice is a charity, it has a small staff. They all get excited when they receive letters from listeners and DXers from overseas. There has been a tremendous response from listeners, some of them from Europe and as far as Australia and New Zealand. At times, they are overwhelmed by the amount of responses required, and apologize for any delays in replying to letters.

Testimonies of all kinds keep on pouring in and Christian Voice is very thankful for this overwhelming response. Address:

Radio Christian Voice
Private Bag E606, Lusaka, Zambia
Tel: + 260 1 274 251 & Fax: + 260 32 30282

The best time to hear the station in North America is during our local evening, before sign-off at 2200 and from sign-on at 0400 UTC, on 6065 kHz. You will have to use sideband mode, as the frequency is dominated by the Canadian time station CHU. But give it a try, especially on the East Coast. Further west it may be more of a challenge. Good luck!

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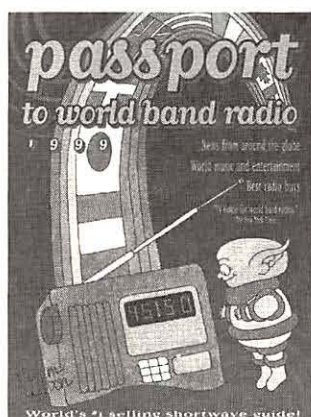
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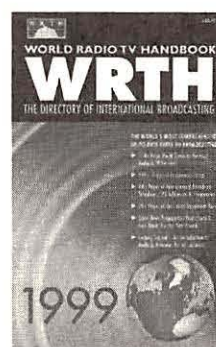
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China Radio International

Story and photos by Valter Aguiar

The world's largest population (1,200,000,000 inhabitants) • The third largest country area size (just after Russia and Canada) • The largest human construction in the world and the only one that can be seen from the Moon (the Great Wall) • The largest hydroelectric dam project in the world (the Three Gorges Dam) • The largest city in Asia and the fourth in the world (Shanghai, in the south, with 13 million inhabitants). Beijing, the capital, is only slightly smaller (just 11 million inhabitants), with its large avenues and thousands of bicycles.

In China, everything is big. With 1.2 billion people to feed, the country is the world's leading producer of rice, wheat, soy and sugar. The Chinese presence in manufacturing and export can be noticed in every corner of the world. Such a large and important country could be expected to have a corresponding

presence on shortwave, and accordingly we have *China Radio International* — just like the country, the third biggest international broadcaster in the world.

Early history

Chinese radio is fully owned by the Communist government, as an important means to maintain the country's unity. The first broadcasting station in China was inaugurated in December 30, 1940: XNCR, New China Radio, was the first name of the current Central People's Broadcasting Station (CPBS).

In December 3, 1941, Northern Shaanxi New China Broadcasting Station made its first appearance on shortwave for international audiences. It was the time of the Pacific War between China and Japan, just after the Japanese invasion of Manchuria and progress-

ing into other regions of China. First broadcasts of the new station were therefore obviously in Japanese, as a part of the war effort.

English broadcasts only started in September 11, 1947, with the first English announcer



The author presents a listener's letter program in Portuguese, with Portuguese department vice-director Ms. Wei Lin.



The old gray building that first housed CRI.



CRI's modern new home took ten years to build.

Ms. Wei Lin presenting daily 20-minute programs from the cave studio in Hebei province. Two years later, when Mao Tse-Tung founded the People's Republic of China, the station was moved to the new capital, Peking, and then renamed *Radio Peking* (which became *Radio Beijing* in the 1980s).

Radio Beijing has never stopped its development towards becoming one of the world's largest international broadcasters. In 1950, standard Chinese and other Asian languages were added to its transmissions. Further languages have subsequently been added, and now they are 43, including four local Chinese dialects and also Esperanto. Dr. Zamenhoff would surely be proud to hear daily Esperanto broadcasts from China, which started in 1964 and are now available to listeners in Asia, Europe and Latin America.

Radio Beijing became well known to shortwave listeners for three main reasons. First, the Chinese government propaganda, especially in its early days. Second, the cultural programs which gradually replaced propaganda as time passed. This includes typical Chinese music, programs on Chinese history and tales, cooking shows and even Chinese language lessons, if you are patient enough to learn what is probably the most difficult language in the world.

The third reason is the beautiful souvenir package offered by the station: nice QSL cards, beautiful pennants, stickers, bags and the like. Chinese papercuts are especially appreciated by the listeners and make them marvel at how these wonderful souvenirs (a 200-year craft tradition in China) can be made. (If you haven't gotten your souvenirs, don't lose more time: the station address is at the bottom of this article.)

If you are especially lucky, you can even win a free trip to China in one of the various contests sponsored by the station from time to

time. It is indeed a deep emotion to walk downtown Beijing, hearing the chimes of the clock at the Beijing Telecom building just a few quarters away from Tiananmen Square — the same ones used as the station's interval signal! In Beijing you will also be able to hear the Capital Service — foreign language programs produced for local stations in China. This service, started in 1984 only in Beijing, is now broadcast by thirteen local stations in ten foreign languages.

Non-stop development of shortwave

While other shortwave broadcasters were reducing their on-air time and languages, the 1990s have been very special years for Radio Beijing. In May 1990, the English department started to publish *The Messenger*, a bimonthly guide to broadcasts in English and other languages.

At that time, the name *Radio Beijing* was causing a bit of confusion among local radio listeners in China. This is because the local radio in the capital is also called *Radio Beijing*.

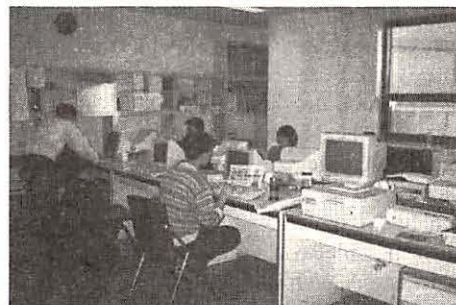
Sometimes even the post office mixed up letter delivery between the stations.

To avoid confusion, the overseas service changed its name to *China Radio International* (CRI) on January 1, 1993. In reality, it was just a translation of the official name already used by the Chinese department since 1978. This is now the station's official name, although some old-time listeners (like the author) still like to call it *Radio Beijing* as in old times.

But the changes did not stop. Until recently, China Radio International occupied the building of the Ministry of Radio, Film and Television, built in 1958. In the same address, local CPBS and CCTV (China Central Television) also had their offices and studios. China Radio International wasn't the only that had grown over the years. CCTV, which in 1992 inaugurated its international channel (CCTV-4), was now available to TV viewers worldwide by satellite, with Chinese and English language programs.

The old building had therefore become too small for all of them. Also, it presented technical obstacles which were difficult to correct. To meet these problems, CCTV moved to a brand-new building downtown Beijing, while new facilities for China Radio International were constructed in the Western district of Lugu.

The new CRI newsroom.



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The English department replies to letters (and e-mail) — a high priority at CRI



The inauguration of the new building in 1996 also marked the first use of digital equipment for CRI. Computers are now used to write news and programs, translate them into each language, tape and edit each program, and send them to the transmitter sites in China and overseas. The new building has fifty studios and facilities to broadcast 17 different programs simultaneously. China Radio International is finally a modern broadcaster, after all the investment in worldwide shortwave radio made by the country's government over a "decade of decadence."

Not that CRI is opposed to new broadcast technologies: Agreements for retransmission of CRI programs by local radio stations are being signed worldwide, thus making them audible to a vastly larger number of listeners. A Web site was put into operation by year-end 1997, and Real Audio transmissions may come soon over the Internet.

However, CRI knows that shortwave broadcasts still have a long time to go before (if ever) being completely substituted by the

Visitors can view some of the ancient broadcast equipment!



new technologies, especially in the less developed countries. This includes large portions of Asia, where China Radio International has a large number of listeners. Many of them have joined CRI listeners' clubs — today, according to the station, over 2,000 worldwide, especially in Asian countries like Pakistan.



CRI is proud to display souvenirs from its listeners all over the world.

And the station is really proud of its listeners! More than 600,000 letters are received yearly. All of them are duly answered and comments are sent to the programs' producers. Now they have e-mail as well, and messages to all language departments can be sent to the same address at the end of this article. Nearly every publication issued by CRI includes comments received by listeners.

In the new building, there are three corridors where cabinets display a few souvenirs received from worldwide listeners. There is one case for each language department, comprising a worldwide exhibition of souvenirs from all countries.

**CHINA RADIO INTERNATIONAL
BROADCAST SCHEDULE IN
ENGLISH
(ALL TIMES UTC)**

To North America

0300-0400 on 9690 kHz
0400-0500 on 9560 and 9730 kHz
0500-0600 on 9560 kHz
1400-1600 on 7405 kHz

To Europe

2000-2200 on 6950 and 9920 kHz
2200-2230 on 3985 kHz
2200-2300 on 7170 kHz

To South East Asia

1200-1400 on 1341, 9715 and 11660 kHz

To South Asia

1400-1500 on 9535 and 11825 kHz
1500-1600 on 7160 and 9785 kHz

To South Pacific

0900-1100 on 9785 and 11755 kHz
1200-1300 on 6950 kHz
1200-1400 on 7385 kHz

To Africa

1600-1700 on 9565 and 9620 kHz
1700-1800 on 7150, 7405 and 9750 kHz
1900-2000 on 6955 and 9440 kHz
2000-2100 on 7160, 7170, 7175 and 9440 kHz
2100-2130 on 7170, 7180 and 9535 kHz

**CHINA RADIO INTERNATIONAL
BROADCAST SCHEDULE IN
ESPERANTO
(ALL TIMES UTC)**

To East Asia:

1100-1127 on 7170, 9535 and 11575 kHz

To South East Asia:

1300-1327 on 11600 and 11840 kHz

To Europe:

2000-2027 on 4960, 7405, 9900 and 9965 kHz

To Europe and Latin America:

2230-2257 on 6950 and 9860 kHz

China Radio International Addresses:

China Radio International
Beijing 100039
People's Republic of China

E-mail crieng@public.bta.net.cn
Official Web site <http://www.cri.cngb.com>

Constantly growing

China Radio International programs total 190 hours daily and are broadcast worldwide by 26 transmitter centers throughout the country. CRI also has a relay of its own in Mali, and holds agreements for program re-transmissions with Radio France International (using transmitters in France and French Guyana), Voice of Russia, Spanish Foreign Radio, Radio Canada International and Radiobras (Brazil). This is why CRI signals can be heard at good conditions nearly worldwide, even in unfavorable propagation conditions.

Its 40 local offices in China and 23 international correspondents supply CRI with local and international news. Over the past few years, China Radio International's foreign correspondent team has also become a source of international news for the Chinese media itself. The station proudly states that their correspondents send faster and more accurate reports than the official Chinese news agency Xinhua.

Figures are really impressive, as in every-



Recording in a CRI studio.

thing China undertakes. However, the main reason for CRI's popularity is its people. Most of its announcers are from Mainland China and have Chinese (or local dialects) as their mother tongue. Even so, they are able to produce good quality programs and read them on the air in foreign languages considerably well, thanks to their academic formation in foreign languages.

Besides the language ability of its staff, China Radio International has learned how to

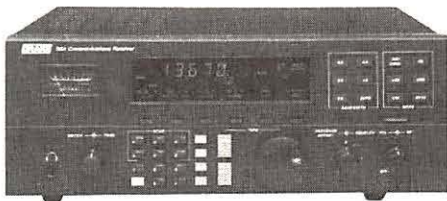
deal with listeners in a unique way and bring them closer to the station. This is done by means of its special attention paid to listeners, both by mail and on the air.

It is true that political propaganda can be found in all government-owned stations throughout the world. But China is also a unique country. Its tradition of millenniums have formed a country's history that perhaps cannot be found in any other place in the world. Chinese people normally live in a happy and friendly environment, despite all the difficulties the country has faced. They welcome foreigners, just like CRI does

with its listeners.

The only way for western people to understand Chinese history, heritage, culture and way of living is visiting China. If this is not possible, the next possible alternative is, of course... China Radio International!

The author wishes to thank Ms. Yu Huijuan, Ms. Wei Lin (same name of the first English announcer is just a coincidence) and the staff of CRI's Portuguese Department for their help in the preparation of this article.



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Take a Shortwave DXpedition

By Hans Johnson

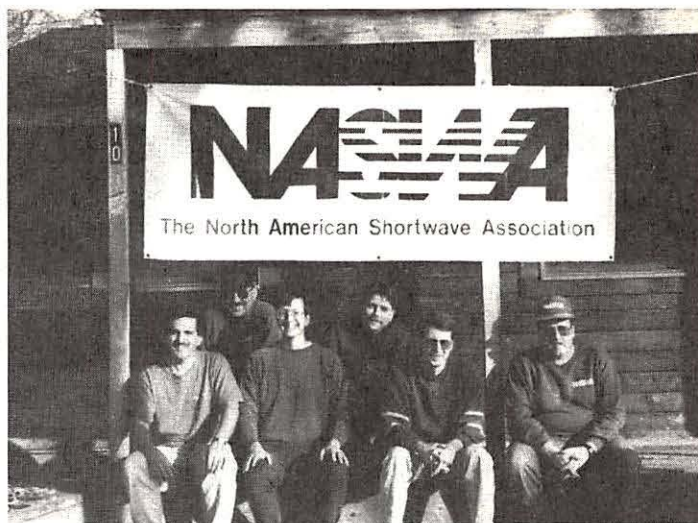
With summer out of the way, the shortwave DXing season (the season of listening for distant radio stations) can now begin. What better way to kick things off than with a DXpedition?!

A DXpedition is a listening session away from home that can last anywhere from a few hours to weeks. No matter where you live, chances are that you don't have a lot of room for outdoor antennas. And I'll bet that most of you are suffering from noise problems of one sort or another. Most DXpeditions are driven by the fact that listeners want to improve their reception.

While you can't change the limitations at home, you can leave home — and take your radio with you. DXpeditions have these characteristics: A change in listening location, more space for antennas, less noise, listening with others, and long DXing sessions. The more of these elements that you can combine on your DXpedition, the better reception will be.

Changing your location can be as simple as DXing from a friend's house. With a bit of poking around, you can also discover suitable sites within a few hours' drive. These sites might either be a park cabin, a

A typical DXpedition set-up. This is from the Mahalo DXpedition in Maui, Hawaii.



DXpeditions bring hobbyists together. Here is the crew at Gifford Pinchot State Park (Front l-r) Rich D'Angelo, Hans Johnson, Dave Valko, Fred Kohlbrenner; (Rear l-r) Kris Field, Tony Orr (courtesy of Fred Kohlbrenner)

home for rent in a resort area, or a tent in the wilderness. If possible, choose a site near the seacoast for the enhanced reception such sites offer.

The bottom line is that by merely changing your location you are getting a different look at the bands and providing yourself with the opportunity to hear some new things.

Calling ahead to the location to ask a few questions will allow you to make a rough guess as to how suitable the site will be: What is the terrain like (clear, or full of thick brush)? Are you allowed to string antennas there? In what direction(s) is there room for antennas? Is power available, and if so, how (overhead or underground utilities)? If the site passes the "phone test," (i.e., there are none!) then give it a try.

■ DXpedition antennas

Rigging antennas on a DXpedition takes a bit of coordination among the participants. It is best to work as a team and string a set of antennas that can be shared. Don't rig antennas too close together; they'll end up interfering with one another.

Two or three receivers can easily use the same antenna with no ill effects through the use of short "jumper" wires — a short length of wire with an alligator clip on one end. Using the clip makes it easy to switch from one antenna to another. Splitter boxes can either be bought or made for antennas that use coax feeds. Beverage antennas are a DXpedition favorite. Favorites are multi-band dipoles. Bring two and string one north-south and the other east-west.

DXers will often comment on how strong signals are on their first DXpedition. What is really going on is that signals *seem* stronger because you've decreased the noise levels. If your site has worked out okay, then there will be a *lot* less noise. Make sure that you work the 2 and 3 MHz range, an area that is often particularly noise-plagued at home.

■ You are not alone

Listening with others is probably the best part of DXpeditions. DXing is often a solitary hobby, but it doesn't have to be that way. A DXpedition is an opportunity to DX with other people who are also searching the spectrum. A bit of quick coordination will have everybody searching a different band. Needless to say, this leads to a lot of

tipoffs going back and forth and the time can be quite productive if you work as a team.

Equally exciting is how much you can learn from other DXers and their equipment. Very few of us are lucky enough to try out a receiver before we buy it: here is a chance to try out several receivers and compare them to your own. Want to test out that hot new piece of peripheral gear? Here may be your chance. The same is true for antennas and various tuning guides. But the great opportunities lie in learning from your colleagues.

Buffalo Road is another famous DXpedition site in western Pennsylvania



Let's face it: most of us learned to DX in a vacuum. While we may have picked up some tips in print, by and large, we learned largely on our own. Watch the other DXers and you will learn quite a lot. Does the DXer base his listening off a hit list? (See "World Class DXing" in the Mar 98 MT) Does he rely often on reference materials or does he know most of the stations in his head? What are the settings on his receiver as he tunes around? If

Dipole traps reach for the sky at the Mahalo DXpedition.



he is just cruising the bands, how does it do it? AM or sideband, how fast does he tune and where does he start? How does he determine what a signal of interest is? What signals are too weak and need to be left for another day? Watch, ask, and learn.

■ Time out!

No article on DXpeditions would be complete without some words on extended listening sessions. There is plenty of DXer lore of favorite brews that they use to keep themselves awake. There is always something to hear but if you stay awake long enough, you will start hearing things even when there isn't anything there. You have to sleep sometime, so adjust your schedule so that you are awake during the peak times for radio activity. For North America, you should be up by 0930 UTC.

Work the stations from Latin America and your morning opening to Asia till mid-morning. Then it is off to bed till early afternoon. Enjoy the afternoon Africans, long-path Asians, and Latins in the evening. Stay up until you see what kind of late evening openings you have (if any) from the Middle East and Africa. Back to bed till 0930.

So call up some of your DXing buddies and



Larry Yamron sets up the "shack" during a Buffalo Road DXpedition.

set up a DXpedition. Book a spot and do it. Your log book will thank you, and you will take home tips and techniques that you can use every day.

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The SSB-CW-AM Receiver Kit from Ten-Tec

By Mike Bryson

If you are looking for an inexpensive shortwave receiver or if you are nuts about a soldering iron, you may want to check out Ten-Tec's 1254 SSB-CW AM receiver kit. I recently put this kit together and I was impressed at the thought that went into the design and documentation of this little shortwave receiver.

If you have ever built a kit and thought it was not very challenging, or if the end product seemed just a fancy blinky toy, be prepared! The Ten-Tec kit is the real McCoy. After you complete this project, you will have a very capable shortwave receiver on your hands.

WHAT TO DO FIRST.

Well, of course you should read the manual and any addendums. That should go without saying, but I know a lot of folks who skip that step and live on the "wild side."

The next thing you should do is to take an inventory of your parts for the Ten-Tec Shortwave Kit. This kit comes with a well written

instruction manual, power supply, detailed circuit diagrams, and even a *Short Wave Listening Hints* book — and a bucket load of components.

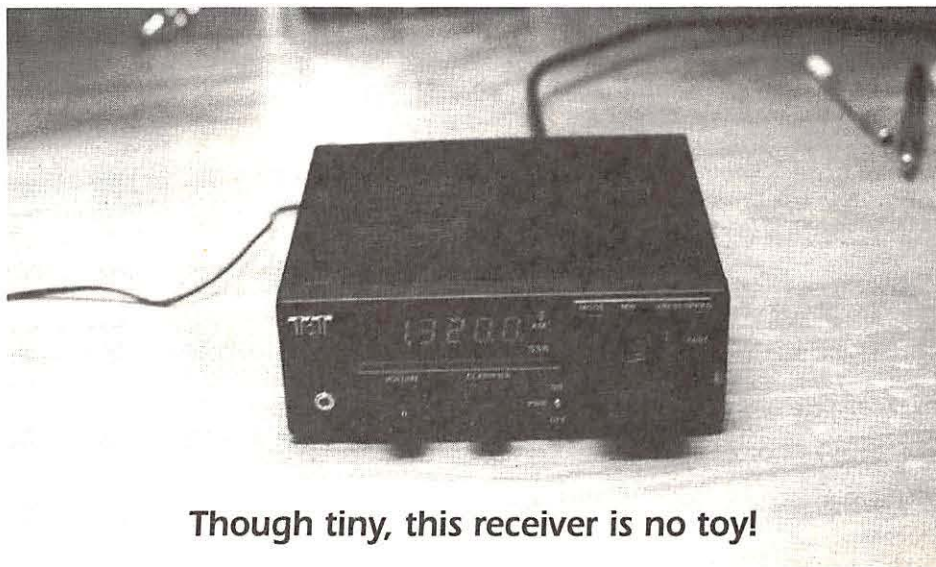
You should make sure that all the components and cabinet parts are there before you start assembling the kit. This will take a while but there is a handy inventory check list in the

manual to help you determine what's what. I found that the components were well organized with separate bags of each type of components ... capacitors, resistors, integrated circuits (ICs), inductors and the like. After spending some time going through the parts, I was impressed that all the components, screws, and miscellaneous items were accounted for. Considering how many parts there were, I felt much encouraged that this was an indication of the over-all quality of the project.

While I was taking stock of the kit, I also separated out the different values of each type of component and assigned them to their own, smaller, parts bags. This would ease sorting through the parts each time I needed to find a specific value component. Later on in the project this turned out to be a really big time saver. After you drudge through the inventory, the fun begins. But if you skip this step you are asking for a heap o' trouble.

SOME ASSEMBLY REQUIRED

Ten-Tec wisely split the assembly of its receiver into seven different phases. When you first look at the number of parts that comprise this project, it is quite daunting. But like any overwhelming project, split into smaller tasks it becomes more manageable. Also, on completion of each phase of this project you get a working circuit that is easily testable.



Though tiny, this receiver is no toy!



Separating the parts by type and value is a real time-saver.



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BC235XLT

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R8A	\$999.95 + \$14 UPS
R8B (new)	\$1159.95 + \$14 UPS
SW8	\$779.95 + \$10 UPS
SW2	\$489.95 + \$7 UPS
SW1	\$199.95 + \$7 UPS

SONY

ICF2010	\$349.95 + \$7 UPS
ICFSW77	\$469.95 + \$7 UPS
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You don't need a whole lot of test equipment because Ten-Tec thought of that for you in their design. The receiver is designed to have built-in test functions that are easily used by even a novice. Again, this shows some forethought in the Ten-Tec design. The only required piece of test equipment is a direct current (DC) voltage meter. Some hand tools are needed, but the main requirement is that you know how to solder.

Though the kit is well thought out, I don't think it is for a beginner. There are a lot of parts and a lot of soldering. There are good descriptions for each component so, if you read carefully, a beginner *could* assemble this kit. But if this is your first kit, you may want to get some help (preferably psychological help!).

Patience is the tool you'll need most. This project is split into several different phases for a reason. Don't try to assemble all the phases at one sitting. I suggest that you try to complete the first phase and then see how it goes from there. There are a lot of parts and the only way to keep from messing up (and spending many, many hours troubleshooting a non-functioning circuit) is to assemble one phase at a time.

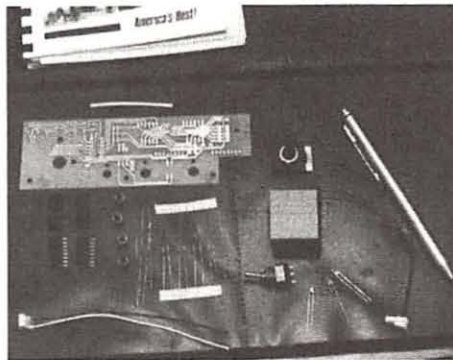
If you take your time, you will come out of this with minimal headaches and a good short-wave receiver. You should spread the assembly of each phase out over a few days if possible. I built this kit in about 25 hours spread over a week or so.

PHASE ONE

Phase one is the assembly of the display board. This board is the simplest part of the project and is used as a warm-up for the assembler. Also, after completion, the display board is used to test progress on all of the following phases!

I can't walk you through each phase step by step, but I can share some assembly tips for each phase. Other than taking care not to scar up the light emitting diode (LED) segmented displays with the soldering iron, there are not too many things that could go wrong for you on phase one.

I noticed in assembling this section that the LED displays cover up the board markings for some of the resistors. You could wait until last to put the displays in or rely instead on the sup-



Phase one is the simplest — and provides the test platform for the rest of the stages.

plied worksheet (recommended in all phases) which also has component placement marked.

It turns out that the resistor markings that are covered up are all the same value. But the diodes are not well marked on the board for the IN4148's so you will need to refer to the additional assembly diagram. This diagram is very useful in all phases so hang onto it. You will handle it so much that it'll look like a used napkin by the time you are through with this project.

PHASE TWO

Phase two of the assembly moves to the main board of the receiver. Specifically, the phase lock loop (PLL) synthesizer and its supporting circuitry are installed. The quick reference summary gives a brief description of what each part is used for, so try to make use of this. I used masking tape to hold the parts down while I soldered. It makes a neater board

and cuts down on moving parts when you turn the board over to solder it. I also mounted all the resistors in all phases with the same orientation. This makes it easier to read the values and also will help you troubleshoot later if you put a resistor in the wrong place(!).

PHASE THREE

Phase three involves assembling the voltage controlled oscillator (VCO) circuitry. This receiver uses two VCO's to tune the whole range of the receiver. Be sure to use caution when installing these parts. As usual, keep the lead lengths as short as possible to avoid parasitic inductance.

This section uses several different diodes and transistors and there is a handy parts identification section in the manual for help on this. I found that after completion of this phase, the alignment of the VCOs was off somewhat. Not to worry: fine tuning after the whole project is complete will take care of this problem.

PHASE FOUR

Phase four deals with the audio output and operation of the volume control. Also after you complete this phase the receiver can detect a 455 kHz signal in AM or single sideband (SSB). You have to be cautious about soldering the audio amplifier; one solder bridge could toast the chip for good. There are no spares, so watch out.

PHASE FIVE

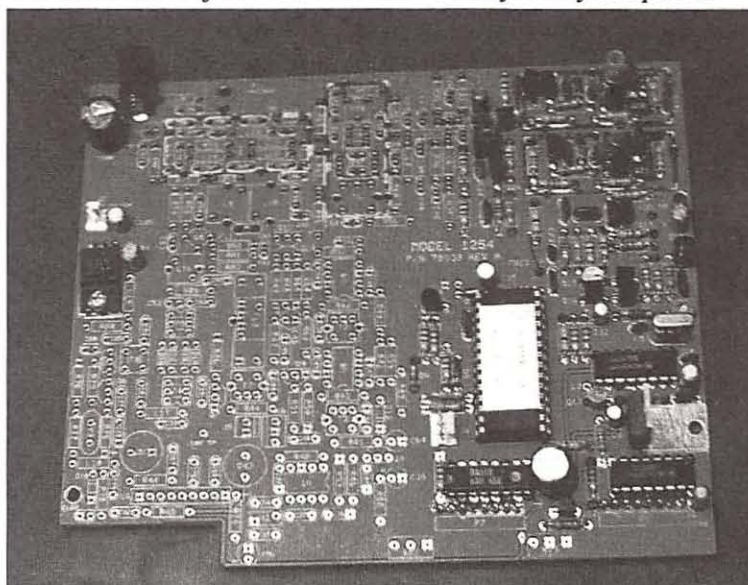
Phase five deals with the assembly of the second mixer and the 45 MHz first intermediate frequency stage (IF). This section is not written as precisely as the previous sections. It looks as though the manual might have been written by more than one person. It is still very usable; it just took some mental adjustment on my part.

After completion of this section, the receiver has a built in 45 MHz test signal capability. You can use this to test the next phase.

PHASE SIX

Phase six deals with the assembly of the radio frequency (RF) input stage and the first mixer circuit. After the completion of phase six, the receiver will be complete. All that is left now is some

The main board of the receiver with assembly nearly completed.



serious tweaking of the various circuits to have a working shortwave receiver.

PHASE SEVEN

Phase seven is simply the assembly of the receiver cabinetry and associated hardware. This also involves mounting the display board and the main board into the enclosure. Now it even *looks* like a receiver. This also includes final tweaking and tuning of the circuitry.

PERFORMANCE AND FEATURES

Now that we have sweated through the seven-stage assembly, we can check out our newly constructed shortwave receiver. Note that it took me about 25 hours to complete assembly on this project. I didn't have any problems to troubleshoot, due, I feel, to very well written instructions and my taking the time to plan out each phase of construction ahead of assembly. I could have assembled this faster but I'm also sure that I would have spent a large chunk of time looking for the misplaced component or solder bridge!

The receiver has a frequency coverage from 100 kHz to 30 MHz with the choice of normal or fast tuning. Step size is 2.5 kHz in SSB, 5 kHz AM or 100 kHz in either mode. There is excellent SSB and CW selectivity due to the 4 kHz filter bandwidth, which also gives a fairly good AM audio response. It has fine tuning of SSB and CW using a clarifier circuitry that works rather well.

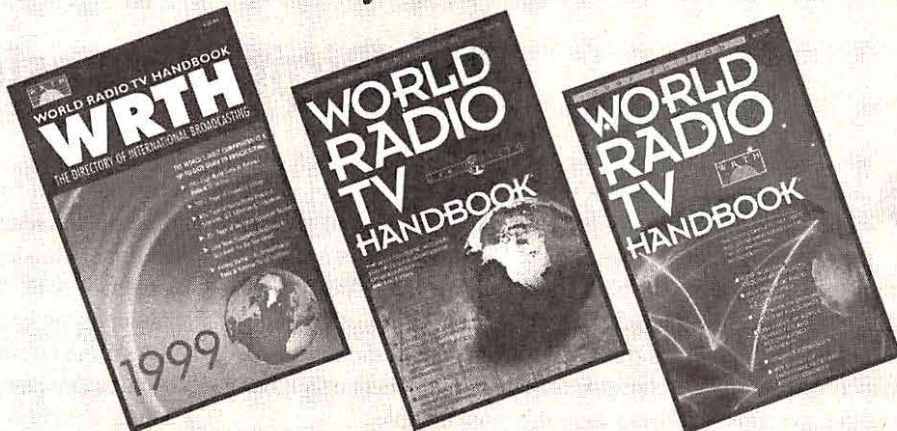
The receiver has direct tuning using a rotary encoder, which gives a smooth tuning motion, or memory tuning with 15 programmable memories with a default memory at 15 MHz (WWV). Of course, it has a 45 MHz first IF and a 455 kHz second IF with a synthesized 45-75 MHz local oscillator for minimal drift. There is an option to supply a DC voltage for an active antenna. That could be handy. The audio output is 1.5 watts with a built-in speaker and headphone jack.

If you like to build kits, or are thinking about getting a low cost shortwave receiver, you should give the Ten-Tec 1254 SSB-CW-AM receiver kit a try. I'd say that half the fun is assembling it. It is great fun to build and it's a decent receiver for the price. I think the folks at Ten-Tec gave this design a lot of thought, not only for constructing a challenging kit, but for designing a nice little shortwave receiver. I am kind of sad now that it's together. I wonder if Ten-Tec makes a bigger kit.....?

Model 1254 is available from Ten-Tec (call 800-833-7373 or write 1185 Dolly Parton Parkway, Sevierville, TN 37862) for \$195 plus shipping.

WRTH - Business as Usual

By Hans Johnson



The *World Radio TV Handbook*, perhaps better known as the *WRTH*, is an annual publication detailing the world's radio and television stations. Enthusiasts have relied upon the book for over half a century as a reference guide in their listening or watching. So the listening community was quite shaken when it learned of the resignations of the main editorial team last fall, particularly when rumors of the book's demise started to circulate. Thankfully, the rumor proved to be just that. The *WRTH* is alive and well and has a new editor, David Bobbett.

Bobbett will be editing the *WRTH* from offices near his home in Milton Keynes, England, which is about 60 miles north of London. Bobbett is a longtime shortwave listener and he is also an amateur radio operator. He is also well-experienced in writing and editing, having once been editor for *Ham Radio Today* and *Radio Communication*. He comes to the *WRTH* from work as a telecommunications journalist.

One of the first things Bobbett did when he was hired last April 2 ("I didn't want to risk starting something on April 1st," Bobbett says.) was to visit the *WRTH*'s former editor in chief, Andy Sennitt. The visit to Amsterdam launched an ongoing cooperative effort between the old team and the new. Sennitt will probably be the one to create the planned *WRTH* webpage.

A new company known as *WRTH Publications Ltd* has purchased the license to produce the book from BPI. The former North American publisher, Watson-Guptill, will continue to publish and distribute the book in the US and Canada.

If one phrase could describe the upcoming 1999 *WRTH*, it would be "business as usual." In spite of the close cooperation with Sennitt, Bobbett has his work cut out for him. Not only is he new to the position, he is also having to prepare the book in half the time while hiring additional staff along the way. Bobbett does expect the *WRTH* to be available at its usual time of just prior to Christmas in North America.

Readers should look for adjustments in the book, rather than wholesale changes, as Bobbett needs to get an edition under his belt first. That is

not to say that large changes will or will not be coming: only that *WRTH* fans should not expect them in 1999 simply because a new editor is in place.

Adjustments for 1999 will include a change in the name. The book will now be known simply as *WRTH*, to be reflected in a new cover design incorporating the acronym. Also look for some changes in the features section of the book and perhaps a slight change in the page count.

The *WRTH* has had problems in the past with slow distribution of the book, particularly outside North America, where some areas have waited months for the book to arrive in their locale. Bobbett hopes that a new and simplified publishing and distribution arrangement will end this problem. Everyone will welcome one thing that won't be changing — the price, which will remain at \$24.95.

While the book could appear on CD-ROM post 1999, Bobbett is not convinced that this is the way to go. "I don't want to give away the family silver," he explains. He is also skeptical that such an offering would be profitable. A more likely scenario is a CD with information that supplements the printed *WRTH*.

Another long-term change that Bobbett hinted at is a reorganization of the country listings. These are listed by continent now, but they may be listed alphabetically in the future.

The *WRTH* has also published a number of other publications over the years. While some of these, such as the *WRTH Satellite/TV Handbook*, may reappear down the road, don't look for them right away. "The *WRTH* is our first priority and remains our core business," explains Bobbett.

The *WRTH* will continue to use monitors and collaborators in preparing the book. Bobbett has an open door policy and he welcomes suggestions, constructive comments, and information from readers. You can reach him at: P.O. Box 7373, Milton Keynes, MK12 5ZL, United Kingdom. His email is editor@wrth.demon.co.uk or fax him at 44 1908 321030. "I am open to any suggestion except resign," stresses Bobbett, laughing.

The Digital Invasion

Public safety radio systems utilizing full-time digital voice technology are gradually becoming more prevalent around the United States. Up until last year, we had seen digital systems constructed in Cleveland and Akron, Ohio (Akron was perhaps the first), the Florida Highway Patrol (and other state agencies) in the southern and east central portions of the state, and certain troops of the New Hampshire State Police. There may have been other systems, but these were the most notable.

Now, in the last four months alone, we've come to understand that four communities in New England alone have gone all digital: Goffstown, New Hampshire; West Warwick, Rhode Island; and Branford and Milford, Connecticut. These are average-sized communities. But the digital cloud does not stop at suburban America or at a few big city systems. The entire state of Delaware is switching over to an APCO (Association of Public Safety Communications Officials) 25 compliant digital system.

Public safety digital makes sense in that it allows users to employ forthcoming communications technologies such as fingerprint transmittals and all manner of advanced gee-whiz gear. It also provides for spectrum efficiency. In this day of crowded airwaves, digital transmissions require a narrower bandwidth. Some public safety agencies also tout the idea that digital provides privacy, but they recognize true privacy only comes with encryption, which would render all efforts to monitor their communications useless. Encryption on digital signals is not that difficult. A law enforcement agency which claims it's only going to digital because they can't find frequencies will show its true colors if they actually spend the money for full encryption.

An April 21 article in the *Providence Journal Bulletin* revealed an interesting case study regarding the digital dichotomy ... or ambivalence, as it were. On the one hand the city of West Warwick, Rhode Island, was proclaiming the dawn of the silent age for scanner listeners as they were switching to a digital system. The local police were unhappy that criminals had been using scanners to track their whereabouts. West Warwick was spending a half-million dollars on their system, which is no small chunk of change for a community of their size.

Upon hearing this news, police officials from other Rhode Island cities and towns were apparently aghast. The police chief in Warwick, right next door, commented in the article, "Often, it's those citizens who are our eyes and ears. They'll hear we're after someone on the scanner — say a drunk driver — and they'll call in and give us a location. So there are pros and cons."

Since APCO is overseeing a national standard for digital public safety systems to allow for competitive pricing of two-way

equipment and for the purposes of interoperability, digital does not mean that scanning will one day come to an end. Even without a national standard, trunking certainly didn't mean the end of scanners — to the contrary, while late in coming, trunking scanners have caused a resurgence of interest.

As more communities dip their toe into the digital waters and switch to these new systems, communications officials around the country should be monitoring the pluses and minuses of digital and weighing their decision to switch. Ultimately, we should eventually see enough critical mass of digital systems for scanner manufacturers to take note of the situation and respond.

Just as trunking scanners proved essential to firefighters on Cape Cod who needed to monitor their new county trunked system, digital scanners will one day prove vital to volunteers and other public safety officials in Delaware who need a low-cost monitoring solution.

We should take it upon ourselves to track the development and operations of digital public safety systems around the country. If your community or county is suggesting a bond, tax or other effort to raise or spend funds on a digital system, become involved and raise the issue of whether the system is intended for features or for privacy. Point out the fact that it's in everyone's interest to have the public monitor non-sensitive communications, including routine public safety traffic. Ask whether low-cost equipment (two-way radios with transmit disabled, most likely) will be made available for the public to monitor. Press for the purchase of APCO-25 compliant equipment so that national standards can at least be met.

Please send me e-mail (scanmaster@aol.com) or write to me at P.O. Box 610428, Newton Highlands, MA 02161, and let me know the details. Which system has been chosen? Who is the manufacturer? Will encryption be used? Will radios be made available to the public? What agencies will use the system? Will any agency remain on their old system? Please send along any other information you have on the systems as well. We'll try to put together a listing of the digital build-outs around the country and keep all of our readers informed. Thanks!

■ LTR Radio — Who's Using It?

The recent International Wireless Communications Expo (IWCE) in Las Vegas showed us quite clearly that 800 MHz and UHF logic trunking radio (LTR) communications is the current wave in commercial radio systems. At least it is for those providers who wish to battle with, or offer an alternative to, NEXTEL.

NEXTEL, with their iDEN radios, is growing exponentially as

they have purchased hundreds of two-way business trunking systems around the nation, have snapped up spectrum, and have changed the entire nature of the mobile radio business in America. You can hardly go to work or go out shopping today without seeing a small contractor or landscaper talking on their NEXTEL radios. Many small two-way dealers have bailed out of the business in the face of NEXTEL's multi-million dollar advertising budget and feature-rich platform.

On the other hand, many claim that NEXTEL is expensive and actually does not offer all the dispatch functionality found on traditional analog radio systems. This is why many two-way firms offer LTR trunking as an alternative. Many radio manufacturers produce LTR equipment and prices are therefore quite reasonable. LTR decoders are on the market, but no scanner manufacturer has produced an LTR-capable receiver. Why not?

The primary reason is that there are actually very few LTR public safety radio systems on the air. There are a few Johnson Multi-net systems, but this is a more advanced version of LTR. There are, however, a great many businesses which use LTR that many of us would find interesting to monitor, including colleges, tow truck outfits, security firms, and others.

I'd like to ask you to do some more work in the name of the scanner cause. If you know of LTR systems in your area, and you're familiar with some of the more interesting users of these systems, please contact me at the address above so that all of our readers can know who's using the old original, but still viable, trunking protocol. If we can demonstrate enough interest in LTR, and provide examples of very compelling system users, we may be able to affect the future of scanner design. These are important issues and I urge you all to take part.

■ Oklahoma Trunking Update

A contributor, who wishes to be known as RDW, sent the following material to us a few months back in regard to the Oklahoma Highway Patrol trunking radio system.

"During the Christmas holidays, the Troop A system was converted from Type I to Type II...Here are the talkgroups as I understand them."

Oklahoma Department of Public Safety Frequencies

(Troop A - Oklahoma City): 861.2125, 862.2125, 863.2125, 864.2125, 865.2125

TG	OHP ID	USAGE
31760	RMA	Tom Units
41616	CH 1	Oklahoma State Capitol Patrol
41648	CH 5	Executive Security
41680	CH 1	AM 1 Troop A Metro (Oklahoma County) Primary
41712	CH 2	AM 2 Troop A Metro (Oklahoma County) Secondary
41744		Paul, Union, and Victor Units (Minimal Traffic)
41776	CH 1	AR 1 Troop A Rural (outside Oklahoma County) Primary
41808	CH 2	AR 2 Troop A Rural (outside Oklahoma County) Secondary
41840	CH 4	Channel 4 for unknown agency
41904		Capitol Patrol or Governor Units Channel 2?
41936		Troop A Supervisors

42000	CH 2	DPS 2
42064	RADIO	Radio Technicians (Paul Units)
42128		Turner and Kilpatrick Turnpike Units
42160	CH 2	Turner and Kilpatrick Turnpike Channel 2?
43408		"Central Control"
45360		Transport (Delta Units)
45488		Mabel Bassett Prison

(Editor's Note: This material is somewhat old and limited. If you have further details on this system and its talkgroups, please be sure to pass it along to us. Thanks.)

■ New York, New York; It's a'Changin' Around

There's been a resurgence in New York. The Mayor has cleaned up the image of the city and crime is down significantly. As part of the effort to beef-up enforcement, the New York Police Department (NYPD) has revamped their frequency plan and acquired (and intends to put into operation) new 480 MHz channels.

New York is, along with Washington, D.C. and Los Angeles, one of the most fascinating regions of the nation to monitor (write me if you quibble with my assessment!). It's also one of the most complex. Below is a portion of the information provided by *Scanner Master* editor Warren Silverman on the new plan for the NYPD and on other Big Apple agencies, including some very complete data on the city trunking radio system.

Scanner Master New York Metro/Northern New Jersey Guide - 6th Edition

New York Police Department Frequency Update

Frequency	CTCSS/Output	Use
470.8375R	136.5	SOD
482.3875R	110.9	S.I. Citywide Interoperability
470.6375	136.5	Intelligence/Command
470.6625R	114.8	SCU
	167.9	SPIN
470.6875R	100.0	CW 1
470.7125R	110.9	CW 2 Warrant Checks only
470.8625R	151.4	CW 3
470.8875R	123.0	CW 4
470.7375R	186.2	Detective 1 WIF-564?
470.7875R	100.0	Detective 2
470.7625R	151.4	OCCB 1 WIF-563
471.0125	167.9	OCCB 2 WIF-569
471.1375	186.2	AB/Command
470.8125R	123.0	Traffic
470.6625R	167.9	SPIN

Planned		
482.6875R	110.9	Citywide Interoperability
482.4625R	123.0	S.I. Traffic
482.4875R	136.5	S.I. S.O.D.
482.6625R	100.0	S.I. CW 1
482.6375R	110.9	SI CW 2
470.8625R	151.4	CW 3
482.4375R	151.4	SI CW 3
482.4125R	123.0	SI CW 4
482.7125	123.0	Manhattan Interoperability
482.7375	136.5	Bronx Interoperability
482.7875	151.4	Brooklyn Interoperability

SCANNING REPORT (continued)

482.8125	167.9	Queens Interoperability
482.8375	186.2	Staten Island N. Interoperability
482.5375	186.2	Staten Island S. Interoperability
471.0875R	100.0	Patrol Boro Manhattan South
471.0625R	110.9	Patrol Boro Manhattan North
471.0375R	123.0	Patrol Boro Bronx
470.9875R	136.5	Patrol Boro Brooklyn South
470.9625R	151.4	Patrol Boro Brooklyn North
470.9375R	167.9	Patrol Boro Queens South
470.9125R	186.2	Patrol Boro Queens North
482.8625R	100.0	Patrol Boro SI North
482.5625R	100.0	Patrol Boro SI South

Parking Enf. District

Freq.	CTCSS	Use	Channel Name	Units utilizing
453.250R	151.4	Bronx Operations, some Qns	Traffic Enf 3	T-201, 202, 401, 401A, 402, 403, 404, 801, 802, 803
453.825R	151.4		Traffic Enf 3A	T-720, 730, 740
453.950R	151.4	Brooklyn Operations	Traffic Enf 3B	T-301, 302, 303, 304, 304A, 305, 802, 804
471.1625R	151.4	Manhattan/Queens/Br'klyn	Traffic Enf 4	T-101, 102, 103, 104, 105, 107, 108, 109, 110
471.1875R	151.4	Manhattan Tow Pound	Traffic Enf 5	T-106, 106A, 108, TIU
471.2125R	151.4	Highway/TIU/TOD/TOPS	Traffic Enf 6	T-501, 502, 503, 504, 505, 800
471.2375R	151.4	Highway Response	DOT 7	DOT units

FDNY Bureau of EMS Radio Usage

Frequency	Usage	CTCSS
478.0125R	Citywide	85.4
478.0125	Command	85.4
477.9125R	Queens 1	85.4
483.6125R	Queens 2	85.4
478.2625R	Brooklyn North	85.4
477.8625R	Brooklyn Central	85.4
484.2375R	Brooklyn South	85.4
484.4875R	Richmond	85.4
483.3625R	Manhattan South	85.4
483.4875R	Manhattan Central	85.4
483.2375R	Manhattan North	85.4
477.8375R	Bronx South	85.4
478.2125R	Bronx North	85.4
477.8625	TAC 1	85.4
487.4875	TAC 2	85.4
MED 1-10	ALS Coordination	167.9

Department of Information, Technology and Telecommunications Trunked Radio System

Uniden Trunktracker Fleet Map b0:S-4; b1:S-0; b2:S-12; b4:S-13
Because of the sizes there are no b3,b5,b6,b7

Sub-Fleet/Talkgroup Identifications

Fleet 3	(Channel numbers in 3 series)	
000-1(A)	Mayor's Office of Emergency Management ALERT	3A
000-2(B)	Department of Health	3B
000-3(C)	HPD????Kate come in please; 239	3C
000-4(D)	New York Botanical Gardens	3D
000-5(E)	NYC Mayor's Office Community Assistance Unit	3E
000-7(G)	NYPD Chief of Department	3G
000-8(H)	Dept. of Business Services; Security & Enforcement Section	3H
000-10(J)	Department of Buildings	3J
000-11(K)	NYC Sheriff/Civil Process	

000-12(L)	Manhattan Boro President's Office	
000-13(M)	Mayor's Office of Emergency Management-Operations	
000-O (15)	Mayor's Office of Emergency Management Interagency	3P

Fleet 2

200-A(01)	Taxi & Limo Commission	Channel Adam	2A
200-B(02)	"	Channel Boy	2B
200-C(03)	"	Channel Charlie	2C
200-D(04)	T&LC Administration		2D
200-5(E)	T&LC ?????10-		
200-F(06)	Correction - Radio Shop		2F
200-G(07)	Correction - ERU - Emergency Response Unit		2G
200-H(08)	Correction - Support Services/Constuction		2H
200-9(I)	Department of Parks and Recreation Commissioner's Staff		2I
200-J(10)	Dept. of Juvenile Justice/Transportation		2J
200-K(11)	Department of Consumer Affairs/Enforcement		2K
200-N(14)	The Center for Animal Care and Control		2N

Fleet 1

Subfleet	Description	
400-A(01)	EXEC	Executive (DEP 1=Commissioner)
400-B(02)	WS/MAN	Manhattan Repairs Water Supply and Waste-water Collection
400-C(03)	WS/BX	Bronx
400-D(04)	WS/BKL	Brooklyn
400-E(05)	WS/QNS	Queens
400-F(06)	WS/SI	Staten Island
400-G(07)	WT/ADM	Administration Water Treatment/Waste Water Pollution Control
400-H(08)	WT/N+S	
400-I(09)	WT/PLN	
400-J(10)	AIR	Bureau of Air Policy and Programs
400-K(11)	WTR-RG	Water Treatment
400-L(12)	HAZMAT	Bureau of Hazardous Materials
400-M(13)	HC/SEW	
400-N(14)	FLT/OP	Fleet/ Operations
400-O(15)	DOITT	(Patched to 000-"O" and 200-"O" and ???)

Type II Fleet

8224	Special Narcotics Prosecutor	
8256	Law Enforcement Kings/New York County DA?	
8288	FDNY Channel 6 Adam-Administration	6-A
8304	FDNY Channel 6 Boy-Operations	6-B
8320	FDNY Channel 6 Charlie-Communications Offices (CO)	6-C
8352	FDNY Channel 6 David-Communications Administrative	6-D
8371	FDNY	
8384	DP&R	
8388	DP&R?	
8432	FDNY BEMS inspections	
8448	FDNY BEMS inspections	
8464	DOI/ FDNY/BEMS Inspections	
8512	HPD	
8528	HPD	
8544	HPD	
8576	DDC/DTC (Dept. of Design and Construction) "Sub Surface Base"	
8592	Mayor's Office, Office of Special Projects and Community Events	
8608	FDNY Fire Marshals	
8624	Department of Correction	
8640	HRA: Office of Revenue Investigation (PRI) Eligibility Verification Review; Fraud Investigators	
8656	Crosswalk TV	
8688	Computer & Data Communications Agency	
8704	Office of the Chief Medical Examiner	
8720	NYCHA-Citywide Maintenance	
8736	NYCHA Emergency Crew	
8752	DOH LAB	
8784	MOEM Executive;	
8800	DOH Security	

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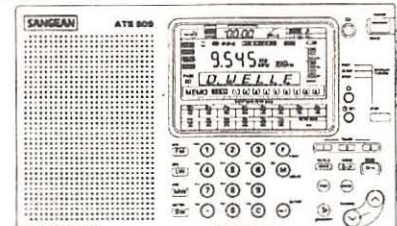
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US Air Force, MacDill: The Last Signoff

Few shortwave (HF) utility stations were better known than MacDill Global, the U.S. Air Force Global High Frequency System (GHFS) station at historic MacDill Air Force Base, located on a peninsula just south of Tampa, Florida. For many years it supported countless military and civilian operations in the Caribbean and Gulf of Mexico, not the least of these being anti-drug operations and hurricane weather reconnaissance. Though both missions now have primary data links on other frequencies, the HF circuits were and are still in daily use.

Well, when June ended, so did MacDill Global, surprising almost everyone. For years, I'd been wondering about this station's status. The base was down to one air refueling mission, and the Global's future was pretty much in limbo. Apparently, DISA, the U.S. military's own Defense Information Systems Agency, had been asking the same questions. Now we all know the answer.

MacDill's exit could hardly have been any more dramatic. At 2400 UTC (Coordinated Universal Time, or "Zulu"), they called Andrews Global on the busy and widely monitored frequency of 11175 kHz USB. Andrews, the Maryland base probably better known to utility listeners for its VIP ("Very Important Person") communications on a different set of frequencies, answered. MacDill then requested permission to secure from the net. Andrews challenged the request, and MacDill authenticated. With this procedure out of the way, MacDill gave the short message. "This is MacDill, MacDill, signing off after fifty years of service, at 01 0000 Zulu July 1998. MacDill out."

And that was that.

■ The End of GHFS?

We HF utility fans can be a gloomy bunch, watching one user after another move their communications to satellites. The initial question, then, was whether the Air Force was also going away. After all, this is the third Global station to vanish.

Fortunately, the answer is no. GHFS is indeed phasing out, but the Air Force is already building its replacement. It's called Scope Command.

Scope stands for "System Capable Of Planned Expansion." After all, it wouldn't be

the U.S. military without a catchy acronym. This one refers to the fact that Scope Command is their first comprehensive approach to HF radio in well over a generation.

Let's look at some history. The present GHFS is something of a hodgepodge. It was pieced together at the end of the Cold War, when the Air Force reorganized. Most of its elements came from two other networks.

First was the Global Command and Control System (GCCS), at that time a radio system used by tactical and supply aircraft, though a completely different project has more recently taken over the name. The other was "Giant Talk," a global net used by the Strategic Air Command to support its nuclear deterrent. When SAC went away to become part of the U.S. Strategic Command, most of Giant Talk was merged into GCCS. The ultimate combination, using some frequencies from one and some from the other, evolved quickly into GHFS.

Just about everyone already knows these frequencies. They're 4724, 6712, 6739, 8968, 8992, 11175, 13200, 15016, and 17976 kHz, all USB. Most official sources also list 10780, a GHFS backup usually controlled by Cape Radio, Cape Canaveral, Florida. 10780 is good for rocket launches on the Eastern Test Range, including the space shuttle. This makes 10 frequencies to monitor, much better than the old 25 or 30, and these are some of the best listening on HF.

GHFS works, but it's clunky. What with the U.S. Navy and even the Army moving much of their traffic there, operating procedures get confusing. So does frequency selection, with users moving two or three times trying to get a clean link for a phone patch. Finally, the farflung net is a logistical challenge to maintain.

So enter Scope Command. Exit Bayonne and Albrook Global, and, as we've just heard, exit MacDill.

■ In with the New

Scope Command, as noted in its mission statement, replaces or controls just about every HF radio over 1000 watts in the entire Air Force. It will continue to use the existing frequencies, but with quite a few changes.

The most obvious one is the "Lights Out" capability. It specifies that all 14 ground facili-

ties will be remotely operated from a Central Network Control Station (CNCS) at Andrews AFB. Everything else, the world over, will be unattended.

The Defense Department has directed all services to investigate whether their high-power HF circuits can be made part of Scope Command. At a minimum, we'll see the huge, "Mystic Star" net (officially called SAMCOM, for Special Air Missions Communications) get incorporated. Even though Mystic Star is already controlled from Andrews, I'll be interested to see just how Scope Command handles SAMCOM's awesome global responsibilities. Among these are HF communications for the U.S. President and Vice-President.

Actually, Scope Command was supposed to be finished by now, but a request from the Air Mobility Command, a heavy GHFS user, sent them back to the drawing board. The AMC wanted full Automatic Link Establishment (ALE) capability. ALE attempts to make HF circuits more transparent to users by repeatedly optimizing such parameters as frequency, power, and antenna. The ideal situation resembles the telephone, where the end user never has to think about how much real-time grunt work is going into the connection. It's becoming popular all over HF, and you may have heard its link-optimizing data bursts.

As for MacDill, some of its communication missions will move to Puerto Rico. Others are simply being terminated. Expanded stations at Andrews and Offutt AFB, Nebrasks, will take up some of the slack. Meanwhile, the 1998 hurricane season just got a little more interesting. So long, MacDill, and good job!

Scope Command Ground Stations

Andersen AFB	Guam
Andrews AFB	Maryland
Ascension Island	Atlantic, off Africa
Croughton AB	United Kingdom
Diego Garcia Island	Indian Ocean
Elmendorf AFB	Alaska
Hickam AFB	Hawaii
Incirk AB	Turkey
Lajes Field	Azores Islands
Offutt AFB	Nebraska
Salinas	Puerto Rico
Thule AB	Greenland
West Coast	N. California
Yokota AB	Japan

Diego Garcia is a NASA site and Salinas is Mystic Star. West Coast is McClellan Global, near Sacramento, Calif., but base closures forced a new name.

Abbreviations used in this column

AFB	Air Force Base	HMS	Her Majesty's Ship (UK)
AM	Amplitude Modulation	ID	Identification
ARQ	Error-correcting teleprinter system	LDOC	Long Distance Operational Control
ARQ6-90	Single channel 6-character ARQ teleprinting system	m/v	Motor Vessel
ARQ-E3	Single channel ARQ teleprinter system	Packet	Teleprinting system that sends data in packets
ASW	Anti-Submarine Warfare	Pactor	Packet teleprinting over radio
Baud	Unit of digital transmission speed	PTT	Post, Telegraph, and Telephone Administration
CG	Coast Guard	RTTY	Radioteletype
CW	Morse code telegraphy	RYs	RTTY test string RYRYRY...
EAM	Emergency Action Message	UK	United Kingdom
Fax	Facsimile	UN	United Nations
FEC	Forward error correction teleprinter system	Unid	Unidentified
F.S.	French Ship	US	United States
GHFS	Global High Frequency System (US Air Force)	VIP	Very Important Person (distinguished visitor)

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time).

- 111.0 SOA211-Warsaw Meteorological, Poland, weather reports in RTTY at 0013. (Ary Boender-Netherlands)
- 2391.0 PHFS-m/v *Rijnborg*, at 2348. PIMT-m/v *Waterman*, at 2350. PHCX-m/v *Roelof*, at 2351. PEFA-m/v *Gaastborg*, at 2352. PDRF-m/v *Doggersbank*, at 2355. (Boender-Netherlands)
- 2591.0 Architect-Royal Air Force, UK, weather at 2325. (Boender-Netherlands)
- 2598.0 Canadian CG, Stephenville, Newfoundland, with weather at 0214. (Ron Perron-MD)
- 2626.0 FTJ-Mossad, Israel, numbers, also 4460 kHz, at 2300. (Boender-Netherlands)
- 2670.0 US Coast Guard, Moriches, NY, with fishing vessel *Ocean Gem*, regarding sighting of a life ring in the water, at 0111. (Perron-MD)
- 2806.0 IGJ41-Italian Navy, Augusta, Italy, RTTY at 2318. (Boender-Netherlands)
- 3840.0 YHF-Mossad, Israel, numbers at 2300. (Boender-Netherlands)
- 4041.0 Unid-Station broadcasts nonstop clicking sound, signal never fades, first at 1803. (Boender-Netherlands)
- 4165.0 MIW2-Mossad, Israel, numbers at 2218. (Boender-Netherlands)
- 4460.0 FTJ-Mossad, Israel, numbers, also 2626 kHz, AM at 2300. (Boender-Netherlands)
- 4467.0 ELMF7-Elf/Soekor Oil Rig, with message, "Good morning! Please send report by e-mail," in 300-baud packet, at 0519. (Bob Hall-RSA)
- 4665.0 KPA2-Mossad, Israel, numbers at 2220. (Boender-Netherlands)
- 4690.0 Unid-Another clicking sound, at 1137. (Boender-Netherlands)
- 4880.0 ULX2-Mossad, Israel, numbers in AM, at 2301 and 2203. (Boender-Netherlands)
- 5178.0 Unid-"Backwards Music Station," mysterious oddity that produces weird tones, at 2156. (Boender-Netherlands) *Name apparently comes from similarity to the backward noises in rock songs, though it's no specific tune.* -Hugh
- 5206.0 "Control"-Royal Navy training net, UK, at 0720. (Boender-Netherlands)
- 5347.5 "A1"-Controlling Dutch military tactical net, voice and RTTY, at 2134. (Boender-Netherlands)
- 5598.0 Gander-Air route control, Canada, with Reach 6303 (a US Air Force Air Mobility Command transport), at 0202. (Perron-MD)
- 5705.0 Implicate-US Strategic Command, working Nightwatch 01, airborne CP, at 0333. (Jeff Haverlah, TX) *Zulu-145.* -Hugh

- 5717.0 Coast Guard Rescue 1503-USCG HC-130, telling Canadian Forces, Halifax Military, of intent to return to base in Elizabeth City, at 0245. (Perron-MD)
- 5760.0 Unid-Spanish female 5-figure numbers, in AM at 0228. (Gary Neal-TX)
- 5788.0 Unid-CW numbers station with message ID 411, at 2030. (Boender-Netherlands)
- 5800.0 Implicate-US Strategic Command, calling Nightwatch 01 at 0325. WAR 46-US Joint Alternate CP, PA, working Nightwatch, the airborne CP; went to landline after copy was bad, at 0411. (Haverlah-TX) *Zulu-150.* -Hugh
- 6485.0 Lincolnshire Poacher, British numbers, possibly Cyprus, also on 5422 kHz, at 2200. (Boender-Netherlands)
- 6501.0 NMN-US Coast Guard, Chesapeake, VA, weather at 2351. (Boender-Netherlands)
- 6577.0 New York-Air route control, NY, with Razor 85, at 0158. (Perron-MD) *Could be an FB-111 out of Pease AFB.* -Hugh
- 6637.0 Houston Radio-Rockwell/Collins LDOC, TX, with aircraft Cappy 103, at 0214. (Perron-MD)
- 6683.0 Andrews-US Air Force Special Air Mission Comm net, working SAM 300, a VIP flight, at 0432. (Haverlah-TX)
- 6694.0 Orion 54-US Navy anti-submarine aircraft from Oceana NAS, VA, reporting "Spare 5" in patch to 433- number, via Halifax Military, at 0013. (Perron-MD)
- 6695.0 Unid-"The Whales," a sweep-tone oddity that makes haunting, whale-like noises, at 1934. (Boender-Netherlands) *There have been "whales" on HF before. They always seem to pop up near US Navy frequencies. Circuit noise, telemetry, or ????* -Hugh
- 6706.0 GUYW-HMS Guernsey, UK, with Hotel 19, at 0945. (Boender-Netherlands)
- 6730.0 Pacaf 01-Commander, US Pacific Air Force, in long patch via Andrews Mystic Star, two generals conferring on upcoming exercises, later given F-153 (8063), F-220 (11181), F-287 (11226), and F-177 (unknown), at 2000. (Perron-MD)
- 6738.0 GUSR-HMS Chaser, calling Architect (Royal Air Force, UK), at 0826. (Boender-Netherlands)
- 6739.0 Offut-US Air Force, Offutt AFB, NE, controlling GHFS net for very long EAM, at 0542. (Haverlah-TX) *Offutt is the first station being converted to Scope Command, but net control will eventually move to Andrews.* -Hugh
- 6757.0 Implicate-US Strategic Command, calling Nightwatch 01 at 0326. (Haverlah-TX) *Zulu-165.* -Hugh
- 6761.0 Various weak air-to-air comms at 0341 and 1413. (Haverlah-TX)
- 6870.0 Unid-Spanish male 5-digit numbers, at 0217. (Cam Castillo-Panama)
- 6980.0 Unid-Spanish female 5-digit numbers, interfering with new Radio For Peace International broadcast frequency, at 0200. (Castillo-Panama)
- 7337.0 Lincolnshire Poacher, numbers, also 9251 and 12603 kHz, at 2200. (Boender-Netherlands)
- 7550.0 Unid-Spanish female 5-digit numbers, in AM at 0303. (Castillo-Panama)
- 7831.0 Implicate-US Strategic Command, working Nightwatch, no copy on response, at 0325. (Haverlah-TX) *Zulu-170.* -Hugh
- 7912.7 9JZ-Lusaka Air, traffic and weather in RTTY at 0430. (Hall-RSA)
- 8231.0 Unid-CW numbers station, with "VVV" marker, at 2000. (Boender-Netherlands)
- 8450.0 A9M-CW marker, at 0155. (Castillo-Panama)
- 8600.0 OX22/OX24-CW marker and traffic list, at 2326. (Castillo-Panama)
- 8650.0 SPE 41/63-CW marker, at 0158. (Castillo-Panama)
- 8660.0 SPE 42/61-CW marker at 2318. (Castillo-Panama)
- 8670.0 IAR-CW marker at 0201. TAH-, CW marker at 2320. (Castillo-Panama)
- 8690.0 EAD3/EAD44-CW marker at 2325. (Castillo-Panama)



- 8734.0 SVN42-Athens Radio, Greece, with voice mirror, at 2344. (Boender-Netherlands)
- 8743.0 SVN44-Athens Radio, Greece, with voice mirror at 2339. (Boender-Netherlands)
- 8764.0 NMN-US Coast Guard, Chesapeake, VA, weather at 2336. (Boender-Netherlands)
- 8968.0 Reach 90532-US Air Force Air Mobility Command C-17, in patch through Lajes, UK, to Charleston AFB, at 0155. Jaygo 42-US Air Force, in patch to Andrews VIP, given Mystic Star frequencies F-752 (8047) and F-354 (11053), at 0220. (Perron-MD)
- 8971.0 Bear 02-US Navy P-3, working Bluestar (US Navy anti-submarine and drug interdiction, Puerto Rico), regarding track of suspicious vessel near Haiti, at 0113. Bear 03-US Navy P-3, radio check with Bluestar, who had relay from Shadow 01, regarding intercept of Bear 03's contact, at 0523. Shadow 01 asking Bluestar to go green (secure voice mode), told that his circuit didn't have the capability, at 0538. (Hugh Stegman-CA) Copper Pound 03-Probably a P-3, in Caribbean tracking net with Bluestar, reporting airborne with crew of 12, at 1137. Fighting Tiger 720-US Navy ASW, with V-1-K, reporting "Spare Group 2" at 1835. (Perron-MD) *Thanks, everyone, for the ID on Bluestar. The P-3 ops are getting intense on this frequency. -Hugh*
- 8983.0 Rescue 1718-US Coast Guard HC-130, Clearwater, FL, in phone patch via Chesapeake to Miami Operations, regarding medical evacuation from Cuban waters, at 2139. (Perron-MD)
- 8992.0 Unknown-Possibly Portuguese Air Force, working Alpha 004 in Portuguese, at 0203. MacDill (AFB) relaying EAM to Hotshot at 2358. (Perron-MD)
- 9016.0 WAR 46-US Joint Alternate CP, PA, working Nightwatch 01, then went to Z150 (5800), at 0206. Nightwatch 01 asking WAR 46 for phone patches, which didn't connect because the primary and backup systems were both inoperative, at 0238. (Haverlah-TX) *Zulu-175. -Hugh*
- 9251.0 Lincolnshire Poacher, numbers, jammed, at 2200. (Boender-Netherlands)
- 9996.0 RWM-Moscow, Russia, with time pips and ID, CW at 1958. (Boender-Netherlands)
- 10000.0 BPM-Xian, China, with time signals and Morse ID, at 2000. (Boender-Netherlands)
- 10075.0 Cedar Rapids-Rockwell/Collins LDOC, airport weather at 0110. (Perron-MD)
- 10204.0 Root Alum-US Stratcom, working Nightwatch 01, at 0046. Cleancut-US Stratcom, calling Nightwatch 01, at 0508. (Haverlah-TX) *Zulu-190. -Hugh*
- 10900.0 Unid Spanish male 5-figure numbers at 0220. (Castillo-Panama)
- 11175.0 MacDill-MacDill Global, US Air Force GHFS, FL, telling Andrews Global, Andrews AFB, the following: "This is MacDill, MacDill, signing off permanently at 2400 hours Zulu with over 50 years of service," at 0000. (Lindsay C. Blanton-TX) *See Utility World for more on MacDill. -Hugh* Lightbulb-US Air Force, given Nightwatch net frequencies of Z255 (unknown), Z210 (11229), and Z220 (13245), at 0004. (Perron-MD) *Z255 is most likely 17973 kHz. -Hugh* AirEvac 4614-US Air Force C-141, patch via MacDill (*when there was a MacDill -Hugh*), requested billeting for two patients, one distinguished visitor, 12 crew, and 65 passengers. Reported position over northwest Caribbean. Sooner 85, a C-130, advising via Andrews AFB phone patch that the aircraft had to shut an engine down, at 1844. Reach 007-US Air Force Air Mobility Command C-17, patch via Thule to Sigonella, Italy CP for 0300 arrival from Bahrain, cargo and maintenance writeup, at 0200. (Allan Stern-FL)
- 11181.0 Sea Bass-US Strategic Command, working Nightwatch 01, also using 9016.0 (Z175), 10204.0 (Z190), and 13242.0 (Z215), at 1238. (Haverlah-TX) *11181 is Zulu-200. Hugh*
- 11187.0 Jaywalk-US Air Force, calling Boomtown, on "Charlie Bravo" frequency, no response, at 1356. (Haverlah-TX)
- 11214.0 Dark Star Mike-US Air Force, in phone patch to Okie Sam, via Trenton Military (Canada), at 1135. (Perron-MD)
- 11244.0 Implicate-US Strategic Command, asking Thule Air Base, Greenland, for Nightwatch 01 working frequencies, at 0330. Reputable-US Stratcom, asking Croughton (UK) for Nightwatch net frequencies. Croughton patched him to Nightwatch 01 instead. Nightwatch told him to call a number at Offutt AFB, eventually Croughton connected him to "Stratcom Command Center," who asked which net he was trying to enter. Eventually, another patch, at which point stations faded. All this started at 0506. Accompany-US Stratcom, tried to raise Offutt Global, then answered Mainsail (all station call) from what sounded like "Log Roll." Tried to move "Log Roll" to Z175 (9016 kHz), but couldn't, all this starting at 1801. Big Ranch-US Stratcom, with 26-character EAM, just before McClellan Global's scheduled transmission of same, at 2316. (Haverlah-TX)
- 11267.0 Unid-two female US Air Force operators, different stations, both with same, unusually long, EAM and stepping all over one another, at 2018. (Stern-FL)
- 11545.0 Lincolnshire Poacher, numbers, at 1900. (Boender-Netherlands)
- 13375.0 Lincolnshire Poacher, numbers at 1500, 1600, and 1700. (Boender-Netherlands)
- 14000.0 "Frank Young Peter"-Numbers at 1400 and 1700. (Boender-Netherlands) *Attention, ham band intruder watch. -Hugh*
- 14405.0 UN High Commission for Refugees, possible Swahili message, mentioned Johannesburg, RSA, in pactor at 1043. UNHCR, Kinhasa, with French language administrative traffic in pactor at 1240. (Hall-RSA)
- 14432.0 PTT, Lumumbashi, with French language traffic to Rennies Cargo Terminal, then several personal Telexes, in ARQ at 0950. (Hall-RSA)
- 14487.0 Lincolnshire Poacher, numbers at 1400 and 1700. (Boender-Netherlands)
- 14686.0 Atlas-US Customs Service, TX, with aircraft 19 Charlie and 20 Charlie, at 1805. (Perron-MD)
- 14698.0 "1-A-V"-US Navy, with coded traffic and EAM, at 1742. (Haverlah-TX)
- 14996.0 RWM-Moscow, Russia, with time pips and ID, CW at 0630. (Boender-Netherlands)
- 15049.0 "W-6-R," with two EAMs, second of which was passed with note that item seven was garbled, at 1427. (Larry Van Horn-NC)
- 15097.0 Nightwatch-US Air Force joint airborne CP, in radio check with High Key, on "Z240" frequency, at 1950. (Perron-MD)
- 16995.0 Unid on-line encrypted traffic, RTTY, at 1210. (Boender-Netherlands)
- 17445.7 5YE-Nairobi Meteorological, Kenya, rebroadcasting Meteo France weather chart, fax at 1600. (Hall-RSA)
- 18597.5 Spanish Embassy, Kinhasa, Zaire, with encrypted traffic in code not seen before, ARQ at 0747. (Hall-RSA)
- 18667.9 JMSFM-Egyptian Embassy, Madrid, traffic to Cairo MFA in both FEC and ARQ modes, at 1600. (Hall-RSA)
- 20179.7 RFFIC-Marine Sirpa Paris, French language traffic for several routes, in arq-e3 at 1142. (Hall-RSA)
- 20439.0 RYAD-French embassy, Riyadh, Saudi Arabia, coded arq6-90 traffic for routing via RDHX, at 1630. (Peter Thompson-UK)
- 20633.7 RFFINDI, French Navy, arq-e3 traffic on positions of Indian Ocean Fleet, for RFFIC, Marine Sirpa Paris, and via RFVIFLR (F.S. Floreal), at 1507. (Thompson-UK)
- 20856.6 RFQP-French Navy, Djibouti, arq-e3 traffic for "Controle de Voie," with DJK routing (through Dakar, Senegal), at 1317. (Thompson-UK)



Addressing ACARS

In this month's column we'll take a break from our examination of HF modes and focus on one of the newer VHF modes instead: ACARS - Aircraft Communications Addressing and Reporting System.

During peak air traffic periods, over 1,000 commercial flights may be found just in the skies over North America alone. Air traffic control centers operated by the Federal Aviation Administration (FAA) in the United States and NAVCanada in Canada are entrusted with the gargantuan task of air traffic command and control management. No less onerous an undertaking is the myriad of voice contacts between flight deck crews and ground controllers/flight operations managers that keep the airborne fleet flying safely and efficiently.

Much of the voice contact traffic in the past was devoted to describing routine aircraft maneuvers such as push back from the gate, take off, landing and gate arrival at the destination. Added to this were messages on aircraft performance, fuel consumption, position reports, etc. Voice contacts generally require that the message receiver repeat the message content in its entirety so that the sender can confirm successful transmission.

As flight engineers were eliminated from the flight decks of many aircraft, the reporting part of their job now fell to the pilots and copilots, making the need to find a method to handle these routine air/ground communications even more critical.

The ACARS solution was developed and implemented for the aviation industry by ARINC (Aeronautical Radio Inc.) in the mid 1970's. The system was designed to cut down on flight crew work load by utilizing computers on board aircraft and at ground facilities to exchange routine reports and messages. However, it took nearly two decades for computer technology and equipment cost effectiveness to catch up with the reality.

While not every airline carrier is ACARS-equipped and not all aircraft in the fleet may be outfitted, the number of aircraft utilizing the system is growing significantly. ACARS is now a standard package on all new Airbus and Boeing deliveries.

■ What is ACARS?

ACARS is the acronym for Aircraft Communications Addressing and Reporting System. This system is an air/ground network which enables aircraft to function as mobile computer terminals linked to a ground-based command and control management system. Information collected from sensors onboard ACARS-equipped aircraft is automatically transferred by VHF radio link to ACARS ground facilities. It is then relayed via the ground stations to a central computer processor where the data is converted into inter-airline operational messages through the ARINC Electronic Switching System (ESS).

Over 9 million ACARS messages are currently processed in any given month.

■ ACARS Components

Three major elements comprise the ACARS Network.

1. The Airborne Subsystem (onboard the aircraft), which consists of the Management and Control units.
2. The ARINC Ground System, consisting of the ACARS VHF Remote Networks, the ACARS Front-end Processor System (AFEPS) and the ARINC Electronic Switching System (ESS).
3. The Air Carrier C² (Command and Control) and Management Subsystems which include ground-based flight operations, maintenance centers, dispatch offices, etc., of the various airline carriers who are ACARS-equipped.

■ What Can You Monitor?

For most ACARS monitors (except those living within close proximity to a major airport), transmissions from the aircraft's airborne subsystem are audible only when the aircraft is actually airborne. On good VHF propagation days, with aircraft flying at Flight Levels FL350 and above, you can expect to receive transmissions from up to 300/400 miles away.

Generally these transmissions fall into one of three broad categories:

1. ACARS traffic occurring immediately after departure.
2. ACARS traffic from high altitude flights crossing the Center's Flight Information Region.
3. ACARS traffic from aircraft on approach to land.

The general rule of thumb regarding distant ACARS transmissions is that if VHF voice transmissions can be heard from your location, you will also be able to receive ACARS traffic from the same location.

ACARS transmissions from aircraft on the ground will not generally be audible unless you live within sight of a major airport.

■ What Equipment Do You Need?

To monitor ACARS transmissions you require a VHF scanner/receiver capable of tuning the AM Aircraft band (118.00 MHz to 136.00 MHz). A suitable VHF antenna is also required. While table-top scanner/receivers are preferred, they certainly are not necessary.

There are several standalone and computer related decoders available to the ACARS monitor today. Most units are relatively inexpensive (under \$200) and do an adequate job of decoding airborne traffic.

For further information on ACARS and other digital modes, please see my web site at: www.interlog.com/~reevans/radio/

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The Kiwa Earth Monitor is an ELF-Extremely Low Frequency receiver for listening to the natural radio signals from planet Earth. Hear whistlers, tweeks, the dawn chorus with this sensitive receiver. Tuning range is from 50 Hz to 15 kHz. Features include a remote field probe antenna, noise filter and variable bandpass filter.



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The Problem with Digital Shortwave

Ernie Behr of Ontario, Canada, offers the following opinion: "I've been listening to shortwave radio for nearly 45 years, but I never heard such horrible audio before 1996. Radio Netherlands, Radio Canada International and HCJB are among the worst, terribly overmodulated, with wide splatter and clicking sounds between each word, apparently due to poor audio processing, and tinny-sounding digital phone lines. In fact, the audio quality of RN, RCI and HCJB is so bad, one can barely understand phone conversations, even when the signals are 50 over S9 on my R-5000 receiver.

"According to RN, 'the biggest difference will come as we move to completely digital AM. It should then be possible to make SW sound like FM-mono.' Don't count on it. My prediction is, this will put SW radio back into the stone age. It will also be the end of DXing. Bandwidth for these digital signals will be 20-30 kHz, and we can expect a horrible mess on the SW bands, causing listeners to leave in droves.

"Can you imagine 30 kHz wide signals on SW? (20 kHz if only one digital sideband is transmitted). SWLs and DXers should be up in arms about these future plans, and a massive protest should be organized against digital SWBC, by DX clubs, SWL magazines, etc., before it is too late and the SW bands are ruined forever."

Bob Zanotti of Switzerland sheds some light on the case: "The problem may well be in the audio processing now widely in use by SW stations. It's a very sophisticated, state-of-the-art processor called the Orban 9105a (they have a Website). This is a modernization of the old Voice of America audio clipper of the Cold War days. All the 'big boys' are using it today, including BBC, RN, Deutsche Welle (DW), Norway, Sweden, Finland, Radio France International, Austria, and the VOA itself.

"There's one big hitch: the Orban produces an incredibly punchy, high-level audio signal, and if the transmitter is old or improperly adjusted, serious splatter and/or poor-sounding modulation will result. Even the usually careful and reliable DW has had splatter trouble because of the Orban.

"I've had a hands-on experience with the 9105a in Schwarzenburg, and I can tell you it's fantastic. But if it's not set up properly, it sounds awful and is actually counterproductive. The year 1996 has been mentioned as the turning point in audio/modulation problems at some stations, and this is exactly the period when the Orban 9105a caught on."

I'll bet that explains the splatter from 21505 to 21770 put out by RN-Bonaire 21590 in Dutch for a World Cup game at 2030-2130. See also NEW ZEALAND (gh)

AUSTRALIA Revival of 21740 [see *Shortwave Guide for revised RA schedule-ed*], used at previous sunspot peak, is a big help in NAM, including *Feedback* UT Sat 0005-0030 opening with the Kookaburra call seldom heard elsewhere on RA (gh)

Former Radio Australia transmitters are up for sale. A senior Federal Minister says the major shortwave transmitters near Darwin are being sold. Government leader in the Senate, Robert Hill, says the shortwave facility at the Cox Peninsula was closed last year because it is no longer relevant to Southeast Asia. He told the Senate that Southeast Asia has myriad communication alternatives and there is no longer the need for the Radio Australia shortwave broadcasts.

"It was our opinion that areas into Southeast Asia no longer required shortwave because of access to communications through more popular methods — normal radio being an obvious example" (RA website via Pete Costello)

BELARUS R. Minsk moved 0400-0600 broadcast for Europe to 0100-0300, so is it now for NAM? On 7210, 11670, English at 0200 M/W/F/S/S (*Panview*, Bulgaria)

[non] Due to the lack of a free press in Belarus, a Radio Free Belarus will be set up this autumn in Poland to broadcast on MW from Bialystok, with approval of Polish government and rumored US backing; the Belarus government objects (Polish press reports via BBCM)

BOUGAINVILLE Radio Free Bougainville has been used for communications recently, not broadcasting, but broadcasting is about to resume. It is known on the island as simply Radio Free and it will serve as the voice of the independence movement during the next several months, explaining and promoting its interests on 3865 kHz AM modulation, 0900-1100 UTC with about 80 watts. While the transmitter site is remote, they are now able with the cease fire to go into town to get supplies, so their previous fuel problems might ease. Look for RFB to stay on through the year as the island moves towards permanent peace (Sam Voron, Australia, *Cumbre DX* Copy-right Hans Johnson)

CAMBODIA National Radio of Cambodia. Received a hand-written, personalized, full page letter from "Kem Yam, Director of International Relations,"

two station stickers, and a schedule.

"If I remember correctly I sent \$1US, 1 International Reply Coupon (IRC), and one postcard of Cleveland, Ohio, about 60 days ago. My report was sent to him airmail, but not registered. Kem states in part that he was pleased I enjoyed the 'Khmer song and music program.' The transmitters are old and they have no spare parts, so the 'output power can not reach the original level.'"

Schedule indicates 1360 kHz and 11940:
English 0000-0015 and 1200-1215
French 0015-0030 and 1215-1230
Thai 0030-0045 and 1230-1245
Lao 0045-0100 and 1245-1300
Vietnamese 0100-0115 and 1300-1315

(Lee Silvi, OH, *Cumbre DX*)

CANADA As of the end of June, Canadian Forces Network, as we know it, disappeared—the end of CFN programme production at RCI. There was a debate in the Department of National Defence as to how best to broadcast to the Forces overseas. It was decided to put the whole thing out to tender. DND apparently wanted about twice as much programming as before, and were willing to pay about half the amount of money. Under those terms, RCI didn't even bother to tender. I wouldn't be surprised if they just cobble together some bits from various commercial stations. Of course, that means the end of CFN programming not only on RCI's satellite channels, but also on shortwave.

RCI has a new QSL card, the first since 1995, showing some RCMP on their 125th anniversary (Bill Westenhaver, RCI)

CANADA [non] Phillip P. Koneswaran, Vice President & Operations Manager for Radio Asia Canada, [who does the English newscast at 2100 himself -gh] gave me an extensive look at the background and plans of RAC. Radio Asia Canada had its origin as a local program aired for half an hour on CHOW-1470 in 1990. This resulted in their application for 1670 kHz, which the Canadian Radio-Television and Telecommunications Commission (CRTC) denied earlier

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; J-98=May-Sept; Z-98=Summer season; W-98=Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

Radio Asia Canada RAC

World Service ONLINE

சென்னை ரேடியோ கனடா

Asiatique Radio Canada

"Bringing Canada to the World"

this year. In 1995 they began making plans for an international service. The first shortwave broadcasts took place in January of this year, with three hours of programming per week towards Asia from Voice of Russia transmitters. A switch to programs towards North America was made May 10th when transmitters operated by Merlin Communications in the U.K. were used for one week. Coverage was not satisfactory but then a contact with Deutsche Telekom resulted in the move to Jülich, Germany. These transmitters are putting a very good signal into North America.

Total airtime is now 8 hours per day. In October this should increase to 12 hours per day. The current shortwave schedule is:

Tamil	2000-2100	15560
Eng	2100-2200	15560
Tamil	2200-0000	11975
Tamil	0000-0200	9560
Tamil	0200-0400	9855

Radio Asia Canada also has plans to add a number of other languages in October, including Russian, German, French, Spanish and an African language. RAC's goal is to represent Canada to the world and if this sounds like a goal that RCI would also have, it should come as no surprise that RAC has been talking to RCI. They are hoping to cooperate with RCI in programming, but nothing is conclusive yet. Mr. Koneswaran was enthusiastic for RAC to be a Canadian voice to the world. The North American audience is growing, judging from listeners contacting the station and the popularity of talk shows that are aired. In North America there are 250,000 to 300,000 people with Tamil roots, according to Mr. Koneswaran.

Due to a ban imposed by the Sri Lankan government, it is not possible for news to be obtained from the SLBC. Announcers come from Toronto, but RAC has offices in a number of countries. Studios in France, Germany and Switzerland contribute a small amount of local programming (Harold Sellers, *DX Ontario*)

Is RAC a terrorist operation? asks Ernie Behr, who points out that Radio Asia Canada openly sympathizes with the "Liberation Tigers of Tamil Elam" (LTTE), one of the world's most brutal terrorist groups, responsible for horrific atrocities in Sri Lanka. Compared to LTTE, the PLO and Hamas are like boy scouts.

Says Behr, Canada has been a safe haven for Tamil terrorists since 1987 when many of these bogus "refugees" arrived here. Most of them have settled in Toronto and it is no secret that they finance the anti-government terror in Sri Lanka with Canadian drug money.

Germany is another major base for Tamil terrorists, who have also attacked the Deutsche Welle relay station in Sri Lanka. DTK in Jülich, which sells shortwave airtime to Radio Asia Canada, is apparently unaware of the terrorist connection, and it is surprising that the Sri Lankan government hasn't protested to the German and Canadian authorities. I suspect they don't even know about the RAC broadcasts or the German transmitter site. Radio Asia Canada, 15560, has a long English newscast at 2100-2159* (Ernie Behr, Ont.)

A few days later RAC started calling itself in English, "Radio Voice of Canada." What right does this private immigrant station without a license in Canada itself, have to represent the entire country vs. RCI? (gh)

CHILE Voz Cristiana added more and more transmitters in July, heard at various times not only on 21550, but 11890, 11690, 15375, 21500, 17680, and announced addresses in Miami (gh)

COLOMBIA La Voz de la Resistencia, FARC clandestine, heard on a Sunday 1410-1430 on 6259.4 with political comments and revolutionary songs; says it's operated by FARC's Comando Conjunto de Occidente and also has stereo FM 106.9 Saturdays at 5 pm local (Rafael Rodriguez R., Colombia) Also 1800-1900 intermittently on 6260v (variable) (BBC Monitoring)

Rdif. Nacional, 4955, has an English program, *On Line* with Fernando Camelo, Tue-Sat 0200-0300, genuinely interested in reception reports, some published in monthly glossy program bulletin (Henrik Klemetz, Colombia, *DSWCI DX Window*)

COSTA RICA RFPI's mirror site, belonging.org is down, and may be for some time. Please go to the original site, which includes a profile of gh from the April issue of *VISTA*: <http://www.clark.net/pub/cwilkins/rfpi> (Joe Bernard, RFPI Mailbag)

More RFPI news from James Latham on another *Mailbag*: The super quad for 6975-AM is 58 feet long and mounted 180 feet high. Tried 6980 first, but signal was too strong in Tasmania. RFPI plans to put all programming on live stream Internet by yearend (via gh) FIRE (Feminist International Radio Endeavor) programming was dropped by RFPI in mid-July due to "irreconcilable differences" with the producers (RFPI)

CZECH REPUBLIC R. Prague announced that an agreement has been reached allowing it to continue Spanish and other languages through the end of 1999 (Jorge Aloy, Argentina, *Los Cuatro Vientos*)

ERITREA [non] Clandestine from SUDAN: 9229.7, Radio Voice of Free Eritrea, 1535 Arabic ID Hazih Iza'at Sawt Eritrea al-Hora, Sawt al-Shab al-Eritery al-Monadel, Sawt al-Hak wa al-Horia wa al-Karama, Sawt al-Ahrar wa al-Shorafa', Sawt al-Tahalof al-Watany al-Eritery (This is Radio Voice of Free Eritrea, Voice of the Eritrean People's Struggle, Voice of the Truth, Freedom and Dignity, Voice of the Free and Honorable Men, Voice of the Eritrean National Alliance). Followed by a reading of the holy Quran, schedule given as 31mb at 6:30-7 p.m. local Eritrea time. 1542 main news and commentary about the Eritrean-Ethiopian unresolved border dispute and renewed fighting between the two nations. Poetry at 1557 and folk chant, 1603 news brief with ID 1605*. The station starts transmission at *1500 in an Eritrean vernacular till 1535 where they shift to Arabic. SINPO 33433. Immediately followed by:

Clandestine from SUDAN: 9229.7, Radio Voice of The Truth. At *1605 interval signal (IS) of machinegun fire, male ID (Arabic) Iza'at Sawt al-Hai, Sawt Harakit al-Jihad al-Islamy al-Eritery (Radio Voice of The Truth, Voice of the Eritrean Islamic 'Jihad' Movement). 1615 a bitter commentary about Afwerki but loyal to the governors in Khartoum. At 1620 religious commentary then 1627 political view point of the People's Armed Forces Front. 1635* end transmission with repeat of schedule and ID with IS machinegun fire. SINPO 33433 (Mahmud Saladin K. Fathi, Egypt, *Cumbre DX*)

IRAQ Baghdad was heard here in London on 11788 (ex-11785) with Arabic at 1945. When I checked the frequency again at 2020 German was in progress, and at 2100, after some "pips" and music, English. Modulation was clear, without the distortion that has previously plagued this station, but there was a noticeable transmitter hum and, although musical items were easy to listen to, speech was much weaker and difficult to follow. There was QRM from Qatar on 11785. It is not clear whether Baghdad has "drifted" to 11788 or deliberately moved because of Qatar (Roger Tidy, England, *WORLD OF RADIO*)

KURDISTAN V. of the People of Kurdistan set up website: <http://www.aha.ru/~said/dang.htm> (*Clandestine Radio Watch*)

MALTA [non]. V. of the Mediterranean, via Russia, 12060, 1900-2000 English news, features, ID. English is on Sat-Thu only. Into Arabic at 2000 and Koran (Brian Alexander, PA)

MAURITIUS MBC had a feasibility study on resuming SW to Mauritians abroad with 100 kW; but new technologies would be cheaper: SSB digital SWBC, or radio via internet (MBC via Tony Vaughan, British DX Club)

MONGOLIA VOM's English to Australia, 1210-1240 on 12085, made it also to NAM on certain midsummer days; a mailbag appeared one Tuesday, but not the next, at 1225 (gh, Joe Hanlon, Larry Russell)

NEW ZEALAND RNZI Mailbox Mon at 0430 on 17675, better at 1130 on 6100 included another interview with RNZI Chief Engineer Dave Henderson by Adrian Sainsbury about digital transmission coming to SW. Says it's quite tolerant of multi-path in tests up to three hops, but no tests yet about short-path and long-path arriving simultaneously. Is about 2-3 years away from starting.

Signal level required for high-quality audio is significantly less with digital than analog—1/4 of the voltage in receiver, or 1/16 of the power [output transmitted], so RNZI's single 100 kW transmitter should be excellent for all the Pacific. Includes feature by which receivers can automatically change frequency when a station signals it is about to change; readouts can be used for any purpose, such as name of station, name of record being played, upcoming programming, etc. RNZI will probably start sooner rather than later, in order to ensure a good signal for relaying by Pacific broadcasters, preferably at first with a combination digital and analog transmission,

DX Listening Digest

More broadcasting information by country compiled by Glenn Hauser

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Glenn Hauser, Box 1684-MT, Enid, OK 73702



if allowed (via gh, *Review Of International Broadcasting*)

The cuts we are to suffer from August: Our large staff of 12 will reduce to 9. Dedicated programmes for South Pacific islands reduced from 11 to 5 hours daily at breakfast. Domestic radio will fill the gap. Hours will be cut by two, closing at 1010 instead of 1205. Future of *Mailbox* uncertain (Adrian Sainsbury, RNZI)

NICARAGUA R. Miskut, 5770, is now putting 500 watts of RF into the antenna; new equipment has been installed. Government troops occupied the station briefly in an effort to prevent broadcast of news of a rebellion in Mismuna. But operations have been restored and there is no longer any interference with broadcasting. Sked is approximately 1200-0230, to be expanded in evening; reports are wanted (John Freeman, Tech Systems, June 21)

Checked June 22 at 1121, found weak but steady open carrier, and programming started 1126 on USB, still audible at 1200 (gh)

NIGERIA [non]. The Wednesday program via WHRA 15460 at 2100-2200 is/was Ogene Ndigbo Radio, a project of the Eastern Mandate Union-Abroad and the World Igbo Council; P.O. Box 91425, Washington, DC 20059 (Ugo Anakwenze, *rec.radio.shortwave*)

PARAGUAY At the inauguration of a new studio, R. Nacional reported they plan a foreign service in English, German, French (Levi Iverson, *NU via BC-DX*)

PORTUGAL Due to conflict in Guinea-Bissau, RDP International expanded SW to there with relay of Lisbon station on 101.5, RDP Africa, on 13745 and 21655 M-F 0600-2400, Sat/Sun 0700-0100 (Carlos L. R. de Assunção, via Noël Green, *BC-DX*) The higher channel could be heard in NAm all the way to sign-off, a good propagational sign (gh)

SAIPAN KHBI is being sold by Herald Broadcasting to Radio Free Asia, price undisclosed, and Herald will retain some airtime for Christian Science programs (*Christian Science Monitor* via Jim Moats) RFA had already been buying lots of time on KHBI; when Monitorradio quit, KHBI was for sale, then not for sale while this was pending (gh)

THE WORLD



SERVICE

OF THE CHRISTIAN
SCIENCE MONITOR

SOMALIA Sam Voron plans at yearend to take at least two 5-watt transmitters with crystals for 3999 to remote towns starved for information so they can have radio stations of their own (*Cumbre DX* Copyright Hans Johnson)

SRI LANKA SLBC has a new website with lots to read and many RealAudio links: <http://www.infolanka.com/people/sisira/slbc.html> (Andy Sennitt, *DSWCI DX Window Caught in the Web*)

SUDAN [non] Clandestine, 6999.9, from ERITREA? Radio Voice of Freedom and Renewal, 6999.9. At around 1545 a Sudanese tribal folk song started and lasted for 15 minutes. *1600 ID by a female voice (Arabic) *Iza'at Sawt al Horia wa al-Tagded*, a short march and *Sawt al-Intifadah al-Sha'bia al-Mosalaha*, *Sawt Nedat al-Shab al-Sudany al-Mosalah* (Radio Voice of Freedom and Renewal, Voice of The People's Armed Uprising, Voice of The Sudanese Armed Struggle). Then a male voice, *Sawt Kuwat al-Tahalof al-Sudanyah* (Voice of The Sudan Alliance Forces). Schedule given as 7 MHz, 7 pm to 8 pm, local Sudan time. Station is heavily jammed by the Sudanese government agents apparently, with call sign *Mahdom*—there are three or maybe four stations. One can hardly follow a complete program. Concluded at 1703* with news brief and ID. SINPO:22332 (Mahmud Saladin K. Fathi, Egypt, *Cumbre DX*)

V. of Sudan, sometimes jammed by Omdurman, 0400-0500 and 1600-1700 daily in Arabic with occasional English on 8000v; E-mail sudanvoice@umma.org (BBCM)

SWEDEN We're experimenting with saving the most recent RealAudio file of the program containing

Sveriges Radio

MediaScan. This means the entire English half hour, so you would have to scroll until around 15 minutes into the program to get to *MediaScan*. It will probably be available the day after the broadcast. The direct URL is: <http://www.sr.se/rs/media/sounds/scdx.ram> Or you can download it with FTP from: <http://www.sr.se/rafiles/rs/program/scdx.ra> (*MediaScan*)

TAHITI R. Tahiti missing from 15170 again for a few weeks (Bryan Clark, New Zealand; Randy Stewart, MO) Heard WYFR instead around 0500 (gh)

TIBET [non] Radio Free Tibet on Interval Signals Archive. Hear a clear recording of the new clandestine station Radio Free Tibet signing-on, at the Interval Signals Archive website. In the External Services section, the site also now incorporates links to the web pages of the featured radio stations/broadcasters. Another new feature is the "Vintage Clips" section, which includes interval signals and announcements from days gone by. The website has many additional sound clips of interval signals and IDs at: <http://www.btinternet.com/~dkernick/index.htm> (Dave Kernick)

UKOGBANI The Chancellor of the Exchequer has announced he is making available an extra 44 megapounds for the BBC World Service over the next three years (Roger Tidy, England; and Ray Woodward, British DX Club)

Among the names on this year's Queen's Honours List were some broadcasting figures: veteran DJ John Peel, OBE, who said he hoped it would get him a season ticket to Anfield; BBC Director General Sir John Birt gets a knighthood (BBC News webpage via Larry Nebron)

Radio London (Big L) will be broadcasting on the Merlin One network (shortwave on three wave bands) from August, 1700-2300 on Saturday nights only. Radio London will be broadcasting its usual 1960s format from the studios of EAP in Frinton-on Sea, Essex (East Anglian Productions via Dave Kenny, British DX Club)

USA WWBS - Here is what Charles Josey told *Cumbre DX* about the status of the station he is building: While running a load through the transmitter, a vacuum capacitor went bad, taking with it several other parts. Antenna has been assembled and is on the roof, but we still need to get a crane to erect it. It is pretty hot to be working up there right now. We expect it to take a month or two to have everything ready. Another reason that we are waiting is that the contract we have with the power company has us at a rate of 15 cents a kilowatt hour, but this will drop in a few months to less than 4 cents. Our initial tests will be with just the exciter at 750 watts on this schedule - 11910 kHz at 2300-0000 and 11905 kHz at 0000-0400. We are talking with the FCC about getting another clear frequency in this band. We have quite a few religious program cassette tapes already here at the station, about 40 hours worth. Our plan is to be going with regular transmissions by October (via Hans Johnson Copyright *Cumbre DX*)

Brother Stair via Germany moved from 3945 to 3955 and 3975. I heard that he cited complaints from North American amateurs as the reason. It seems that the 3945 usage was at the recommendation of Brother Stair's US consultant, who has now learned a lesson in the realities of European frequency selection. I doubt that the FCC/ARRL intervention had the clout that its promoters claim or assume. Far more likely is the fact that the nearby utility frequency of 3943.5 is registered for and used by the French military (Bob Zanotti, HB9ASQ, Berne, Switzerland) Subsequently most of the DTK relays of B.S. including 75m were dropped (Kai Ludwig)

I asked Brother Stair about the possibility of buying WRNO. He gave this reply, "Will not buy WRNO and never work with Mr Baker in his perversion of the truth. He will not get that station to work." (Brother Stair, Thomas Dixon) [latter refers to the supposed Honduran setup]

After the item in last month's column was set and upon the insistence of Rev. Mr. R. Wm. Steltmeier, President of EWTN, Owen Williamson decided to *retract* the statements he made in the lead item in our April column.

We suggest that readers consult the *National Catholic Reporter* article which prompted the comments, "Mahony appeals to Rome about Angelica":

<http://www.nateath.com/archives/013098/013098e.htm> (gh)

The June 20 *Spectrum*, 0200 UT Sunday on WWCR 5070, was the final show (George Thurman, TX) Vague plans formed to return with revamped show in the fall on WGTG-2. Keep an eye on their website <http://spectrum.orn.com> (Jim Wishner, Pete Costello, Hans Johnson)

WGTG is advertising time for sale at \$50 an hour; and Dave Frantz is also interested in signing up "liberal" programs such as those carried on RFPI. Another surprise FCC inspection of WGTG has taken place, the fourth in a year, and once again they found nothing wrong. Dave believes these are politically motivated, but in fact increase the station's standing as technically approved by the FCC. It may be another two months before the second transmitter is on the air, and three and four are in the planning stages. The new transmitter is equipped to use any of several digital systems once a standard is decided upon (Glenn Hauser)

WBCQ, Allan Weiner's new SW station in Maine, "The Planet," plans to start testing the 2nd or 3rd week of August on the old pirate frequency of 7415 (Scott Becker, Free Radio Network Grapevine) A book-in-progress on the net goes into offshore radio and Weiner: <http://www.freebornjohn.net> (gh)

The "C" segment of VOA *Communications World* became audible in NAm when it was switched to 1936 on Sat, 15580 with "B" moving to 2136 (gh)

ZANZIBAR Do you remember the mailing of M. Schoech informing us that he received a QSL-letter from Voice of Tanzania Zanzibar in which they appealed to the DX-community to do some printing of QSL-cards? I have taken up this challenge and sent them a package of some 100 colour QSL cards. One of these cards arrived back here after a trip of 10 weeks. It was accompanied by a kind letter from Abdulrahman M. Said in which he expressed his thanks and stated that 'this will mark another era to Radio DX Listening Clubs' because they will be able to supply the needed cards. So if you want a QSL-card from Sauti ya Tanzania Zanzibar, write now! (Guido Schotmans, DX-Antwerp)

...Until the Next, Best of DX and 73 de Glenn!

<http://www.angelfire.com/ok/worldofradio>

Gayle Van Horn

0000 UTC on 9022

IRAN: Voice of Islamic Republic of Iran. English/Arabic newscast. Holy Koran recitations to 0300; English on 9685 at 0111. (Ronald A. Perron, Glen Burnie, MD)

0000 UTC on 6010

ITALY: RAI. Italian program on easy-listening music, // (parallel) 9760, 11800. (Bob Fraser, Cohasset, MA; Perron, MD; Michael C. McCarty, Galloway, OH; Frank Hillton, Charleston, SC)

0030 UTC on 7115

SERBIA: Radio Yugoslavia. Station interval signal to multilingual news items and features. (Howard Mosser, Lincolnshire, IL)

0034 UTC on 4904.8

PERU: Radio La Oroya. Spanish with fair signal quality for news and *Panorama* program. Identification "siempre por Radio La Oroya." Peru's **Radio Tropical** on 4935 at 0055. (Pedro Arrunategui, Lima, Peru/*Four Winds*)

0045 UTC on 6060

BRAZIL: Radio Universo. Portuguese music and programming to ID. Brazil's **Radio Brasil Central** on 4985 at 2340; **Radio Record**'s soccer match on 6150 at 0055; **Radio Aparecida** on 6135 at 0120 with Portuguese religious text. (Enrique Alejandro Wembagher, Buenos Aires, Argentina)

0105 UTC on 6085.2

BOLIVIA: Radio San Gabriel. Evening messages and mentions of La Paz including station ID in Aymara language. Bolivia's **Radio Fides** in Spanish, Saturday and Sunday broadcast only on 6155 at 0140. **Radiodifusoras Tropico** with Spanish ID and soccer match on 4552 at 0145. (Wembagher, ARG)

0110 UTC on 5047

TOGO: Radio Togo. Presumed broadcasting late tonight, with excellent signal. French news with numerous remotes to live crowd scene. Chuck Rippel, VA/*Cumbre DX*)

0127 UTC on 4915

BRAZIL: Radio Anhanguera. Portuguese. News items to station jingles of "CBN Anhanguera" and canned ID to 0200. Signal poor to fair. (Piet Pijpers, Netherlands/*TFW*)

0149 UTC on 6055

SPAIN: Radio Exterior de España. Spanish service with interviews and music, noted on 17805 at 1710; 15110 at 2125. (Perron, MD; Hillton, SC) website: <www.rtve.es/rne/ree/>

0149 UTC on 7535

USA: WSHB Cypress Creek, SC. Religious services to IDs. Additional religious programming noted as; **WRNO New Orleans**, LA 15420 at 1657; **WHRI Noblesville**, IN 13760 // 15105 at 1650; **WYFR Okeechobee**, FL 15600 at 1700. (Perron, MD)

0150 UTC on 21670

JAPAN: Radio Japan. General Service ending bits of *World of Trivia* program. Station ID, 0300 program preview to abrupt sign off at 0200. (Wallace C. Treibel, WA/*Cumbre DX*; McCarty, OH) website: <www.nhk.or.jp/rjnet/>

0215 UTC on 15485

PAKISTAN: Radio Pakistan. Urdu broadcast continuing past scheduled 0215; gave ID at 0216 and ended transmission at 0225. Signal only fair deteriorating very quickly, unreadable by 0230. (Bob Hill, Littleton, MA/*TFW*)

0215 UTC on 5985

TANZANIA: Radio Tanzania. African hili music with announcement in Swahili, strong interference from 5980 kHz. Station noted on parallel 5050. (Pijpers, NLD/*TFW*)

0217 UTC on 11900

FINLAND: YLE/Radio Finland. Discussion on pedestrian centers and their advantages. (McCarthy, OH) website: <www.yle.fi/rfinland/>

0238 UTC on 9655

AUSTRIA: Radio Austria Intl. English service with newspaper headlines. Good signal, minimal fading. (McCarty, OH) website: <www.orf.at/roi/>

0245 UTC on 4820

BOTSWANA: Radio Botswana. Station sign on at 0245 with interval signal lasting 14 minutes (cow bells/farm animals) followed by national anthem. ID in Setswana giving FM, SW and medium wave frequencies. More chat to tribal style music. (Pijpers, NLD/*TFW*)

0250 UTC on 3281

MOZAMBIQUE: Emissao Provincial de Sofala. Station sign on with national anthem. Announcement by woman in unknown language, interval signal and a presumed news bulletin in Portuguese with "Emissao Provincial" noted. Local music followed while weak signal was fading. (Pijpers, NLD/*TFW*)

0306 UTC on 7450

GREECE: Voice of. Tune in to Greek language lessons to Greek folk music

and news briefs. (Moser, IL) VOG on 7450, 9375, 9420, 11645. (McCarty, OH)

0333 UTC on 5030

COSTA RICA: AWR (Adventist World Radio). *Battle Hymn of Republic* song to Spanish religious text, strong static noise level. (Klaus Elsebusch, Marienthal, Germany/*Hard Core DX*)

0345 UTC on 6950

PIRATE: Star New York Club Radio. Programming monitored in lower sideband, identifying as a "free station in Germany." Station address: P.O. Box 220 342, D-42 373 Wuppertal, Germany. Additional pirates audible: **Jolly Roger Radio Intl** on 6980 at 2200, address: P.O. Box 39, Waterford, Ireland; **Radio Pirana Intl** via **Radio Cochiguaz** in Spanish on 6980 at 2300-address: P.O. Box 2571, 1000 Buenos Aires, Argentina. (Wembagher, ARG)

0432 UTC on 5025

CUBA: Radio Rebelde. Spanish. Male/female hosting *Rebelde DX* show discussing Cuban TV programs. (Nicolas Eramo, Buenos Aires, Argentina/*TFW*)

0453 UTC on 3945

GERMANY: Overcomer Ministries. Brother Stair's sermon to closing short-wave radio offer and 1-800 number. Station ID and South Carolina address. (Elsebusch, Germany/*HCDX*)

0526 UTC on 4914.5

PERU: Radio Cora. Spanish ballads to rooster crow sound effect at 0529. "Radio Cora en Lima, Peru," monitored in LSB to tune out Ghana on 4915. (Harold B. Frodge, Midland, MI)

1000 UTC on 9580

AUSTRALIA: Radio Australia. English report on Kashmir. (Fraser, MA) Monitored 0315 on 17795; 0325 on 15510. (McCarty, OH)

1041 UTC on 4599.29

BOLIVIA: Radio Emisoras Villamontes. Spanish. Very weak signal for program *Amanecer Chaqueño* with regional folklore. Bolivia's **Radio Andes** noted on 4777.7 at 2220; **Radio Movima** 2330 on 4471.9. (Hermond Pedersen, Sweden/*Cumbre DX*)

1256 UTC on 6125

URUGUAY: SODRE. Heard to 1302 with strong signal. Information to navigators in the river plate zone. Station ID as, "transmite CX38 en 1290 kilohertzios, Emisoras del SODRE, Montevideo, Uruguay," then program *Estamos a Tiempo*. (Gabriel Ivan Barrera, Argentina/*Cumbre DX*)

1500 UTC on 15305

CANADA: Radio Canada Intl. Special lighthouse program in French, // 17880, 15365, 17795 kHz. (Lee Silvi, Mentor, OH; McCarty, OH)

1730 UTC on 17757

UK: BBC World Service. *Seeing Stars* program on how stars were named. U.K.'s **Merlin Network One** on 13690 at 2130, // 15590 with *Media Zoo* feature. (Fraser, MA)

1930 UTC on 17735

ECUADOR: HCJB. *Ham Radio Today*, with a series discussing audio quality in radio. (Fraser, MA) 0437 on 9745. (McCarty, OH)

1942 UTC on 17605

NETHERLANDS ANTILLES: Radio Netherlands relay. Newslime program, repeat at 2353 on 9845. Dutch service noted on 6020 // 6165 (Netherlands Antilles) (Perron, MD; McCarty, OH)

2020 UTC on 21550

CHILE: Voz Christiana. Good signal for test transmission in Spanish and English, to abrupt sign off at 2058. (Terry Powers, La Mesa, CA; Fordge, MI)

2025 UTC on 11625

VATICAN: Radio Vatican. English letters to program closing at 2027, "African service" ID to interval signal 2028-2030, into French service. (Frodge, MI; McCarty, OH)

2040 UTC on 15120

NIGERIA: Voice of. Agricultural program on crop growth. Slight interference to signal. (Moser, IL; Frodge, MI)

2040 UTC on 11775

ANGUILLA: Caribbean Beacon. Dr. Gene Scott pontificating a text on Adam yielding his sovereignty. (Frodge, MI)

2101 UTC on 15345

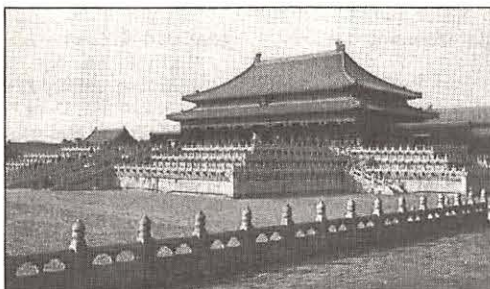
MOROCCO: RTV Marocaine. Upbeat vocal pops to Moroccan music. Station ID and info to 2103. (Moser, IL) Arabic programming 1750-1928 on 15345. (Silvi, OH)

Thanks to our contributors — Have you sent in YOUR logs?
Send to **Gayle Van Horn**, c/o *Monitoring Times* (or e-mail gayle@grove.net)
English broadcast unless otherwise noted.

China Radio International...A Bridge to the World

Looking to add some new countries to your verification (QSL) collection? Thanks to CRI's worldwide relay sites, you can do just that. You can add Brazil, Canada, France, French Guiana, Mali, Spain and Switzerland. (Don't forget to ask for notation of the site on your card.) The friendly staff will usually reply shortly with cards, pennants, stickers, calendars and more. What a deal! Send your report to: 16A Shijingshan Street, 100039 Beijing, China. To learn more about the station, staff, history and more go to their website at: <http://www.cri.cn/gb.com/>

Have you noticed Zambia's Christian Voice website <http://www.christian-vision.org/>? Among the links is a QSL-link, complete with a fill in the blanks reception report, and a "press button" for your certificate! Presto chango...that's it. The wave



of the future? This one I'll have to think about. Seems to take the thrill out of waiting for the postman. You be the judge, folks.

Radio Finland reminds us that reception reports are welcome (as well as return postage). Send your details directly to: Radio Finland, Atten: Mr. Raimo Makela, PL 113, 28101 Pori, Finland, or via email to: raimo.makela@pp.inet.fi. Station

website: <http://www.yle.fi/rfinland/>

Reception reports for the Adventist World Radio outlets in South Africa and Madagascar should be sent to AWR-Europe, Box 383, Forli 47100, Italy. The complete schedule for all AWR programming on shortwave and mediumwave and on the World Radio Network may be seen on the AWR webpages at: <http://www.awr.org>

AUSTRIA

Radio Austria Intl, 9655 kHz. Full data QSL letter unsigned. Received in 16 days for an English taped report. Station address: A 1136 Wien, Wurzburggasse 30, Vienna, Austria. (Walter Szczepaniak, Philadelphia, PA) website: <http://www.orf.at/roi/>

BRAZIL

Radio Aparecida, 5035 kHz. Full data station card with illegible signature. Received in 30 days for a Portuguese report. Station address: Av. Getulio Vargas, 185, Aparecida, Sao Paulo Brazil 125 70 000. (Jose Moura, Washington, DC)

CAMBODIA

National Radio of Cambodia, 11940 kHz. Hand written full page letter from Ken Yam-Director of International Relations, plus two station stickers and a program schedule. Received in 60 days for an English report, one U.S. dollar, one IRC and a souvenir postcard, sent airmail (not registered). Station address: Monivong Blvd. No. 106, Phnom Penh, Cambodia. (Lee Silvi, Mentor, OH) *great QSL! - not reported often! - ed.*

COSTA RICA

Radio Reloj, 4832 kHz. Full data QSL card signed by Francisco Barabona. Received in 15 days for a Spanish report. Station address: P.O. Box 341, San Jose, 1000 Costa Rica. (Moura, DC)

GREECE

Voice of Greece, 6260 kHz. Full data QSL card unsigned, plus mint souvenir stamps, schedule and station history sheet. Received in 59 days for a taped report and one U.S. dollar. Station address: 432, Messogion Av., Athens, Greece. (Szczepaniak, PA) Station website: http://alpha.servicenet.ariadne-t.gr/Docs/Era5_1.html

LITHUANIA

Radio Vilnius, 5950 kHz. Full data QSL card unsigned. Received in 37 days for an English taped report. Station address: Lietuvos Radijas, S. Konarskio 49, LT-2674 Vilnius, Lithuania. (Szczepaniak, PA; Ed Lindley, Biddeford, ME)

MEDIUM WAVE

Caribbean Beacon 690 AM kHz. Full data verification on station letterhead signed by B. Monsell Hazell-Chief Engineer, plus program schedule sheet. Received in four months for an AM report, Anguilla mint stamps and a souvenir postcard. Station address: P.O. Box 690, Anguilla, West Indies. (Lloyd Van Horn, Brasstown, NC)

CKLY-AM 910 kHz. No data verification on station letterhead (nice large logo) signed by Dave Illman-Program Director. Received in 22 days for an AM report and SASE (used for reply). Station states they plan to leave AM for FM 91.9 shortly. Station address: 249 Kent Street-West, Lindsay ON Canada K9V 2Z3. (Harold Frodge, Midland, MI)

KAYK-AM 1690 kHz. Two partial data verification letters signed by Julia Newton-Traffic Manager. Received for an AM report. Station address: 730 West Hampden #300, Englewood, CO 80110-2121. Signer stated the station had been sold and would soon sign on with Radio Disney. (Patrick Martin, Seaside, OR)

WCMQ-AM 1700 kHz. No data verification letter signed by Ralph Chambers-Director of Engineering. Received in 226 days for an AM report and SASE (used for reply). Station address: 1001 Ponce de Leon, Coral Gables, FL. (Frodge, MI; Lee Silvi, Mentor, OH)

WJAE-AM 1440 kHz. No data form letter signed by Tim Moore-Operations Manager. Received in 70 days for an AM report. Station address: 583 Warren Ave., Portland, ME 04103. (WJAB noted on the letter, WLPZ on the envelope) (Mauricio Molano, Madrid, Spain/Hard Core DX)

MEXICO

XERMX/Radio Mexico Intl, 9705 kHz. Full data station logo card with illegible initials signature. Received for an English report. Station address: Grupo IMER, Instituto Mexicano de la Radio, Apartado Postal 21-300, 04021 Mexico D.F., Mexico. (Enrique Alejandro Wembagher, Buenos Aires, Argentina)

MOROCCO

RTV Marocaine, 15345 kHz. Partial data QSL and postcard unsigned. Received in 60 days for an English report, one U.S. dollar, one International Reply Coupon (IRC) and a souvenir postcard. Station address: RTM, 1 rue al-Brihi, Morocco. (Silvi, OH)

PORTUGAL

RDP Intl, 9570 kHz. Full data Belem scenery card unsigned. Received in 31 days for an English report. Station address: Apartado 1011, Lisboa Codex, Portugal. (Bill Wilkins, Springfield, MO)

USA

Radio Taipei Int'l via WYFR-Okeechobee, FL, relay, 5950 kHz. Full data QSL card, stickers and schedule enclosed. Received in 43 days for an English report. Station address: P.O. Box 24-38, Taipei, Taiwan, Rep of China. (Randy Stewart, Springfield, MO; Lindley, ME)

How to Use the SHORTWAVE GUIDE

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Daylight Savings Time) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (8:30 pm Eastern, 5:30 pm Pacific).

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the

station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am: The Americas	as: Asia
na: North America	au: Australia
ca: Central America	pa: Pacific
sa: South America	va: various
eu: Europe	do: domestic broadcast
af: Africa	om: omnidirectional
me: Middle East	

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

Hot News

COMPILED BY JIM FRIMMEL

THE MINIDISC COMES OF AGE.

Recent price reductions in MiniDisc equipment makes this a "must have" item for radio listeners. The Sharp portable MiniDisc recorder model MD-MS702 was on sale at Frye's Electronics in July for \$199. Blank MiniDiscs prices have also dropped to the \$3.50 to \$5.00 range, depending on the quantity in the package.

It is claimed that these neat little 3-1/2" diameter discs are recordable for up to a million times each and can contain up to 74 minutes of stereo sound, the same amount of music as a commercial CD. Since the discs are sealed in a plastic case, much like a floppy disk, they are not susceptible to dropouts caused by fingerprints.

One of the things that makes the MiniDisc special for radio listeners is its ability

to record in monaural sound, thus increasing the continuous recording time to almost 2.5 hours. This is 2.5 times

greater than a single side of the longest music cassette.

Making a recording is as easy as connecting a line cord to the record output of your radio or whatever signal source you are recording from. You can monitor the signal with headphones and start the recording manually or set it to begin when a signal is detected.

Sound is recorded in tracks, just like a CD, and you can digitally label the tracks with text to identify the material recorded. You could record World of Radio on



else.

Copying a stereo music CD to your MiniDisc is simple. The MiniDisc recorder automatically inserts the same track numbers as on the original CD. The tracks then can be labeled using the character generator on the recorder and the track names will display as each track is played back.

Playback of a recorded radio broadcast also provides a unique feature not found on a tape recorder. Because the sound was recorded digitally, it can be played back at twice

track 1, Media Network on track 2, Communications World on track 3, and still have an hour left for something

the speed without the human voice sounding like Mickey Mouse. There is a noticeable loss of sound quality, but it's a handy way to find something on a recording of Glenn Hauser's *World of Radio*. And, the recorder is smart enough to send a mono signal to both sides of your earphones.

The MiniDisc recorder could be the perfect companion to your portable receiver for recording when on a trip. Playback through your car audio system is a snap by connecting the headset output of the recorder to the cassette player using a CD car kit.

MiniDiscs will soon be found in auto radios, replacing cassettes. They also are available in mini-music systems in combination with radio and CD players, and as standalone hifi components. Let the revolution begin!

FREQUENCIES

0000-0100	Anguilla, Caribbean Beacon	6090am				0000-0100	UK, BBC Asian Service	3915as	6195as	7110as	9410as
0000-0100	Australia, Radio	9660pa	12080as	15240pa	17715pa			11945as	11955as	15280as	15310as
		17795pa	21740pa					15360as	17790as		
0000-0100 vl	Australia, VL8K Katherine	5025do				0000-0100	UK, BBC World Service	5970sa	5975am	6175na	9590am
0000-0100 vl	Australia, VL8T Tent Crk	4910do						9915sa	12095sa		
0000-0015	Cambodia, Natl Radio Of	11940as				0000-0100 w	UK, Merlin Network One	9645eu	11985na	13690va	
0000-0100	Canada, CBC N Quebec Svc	9625do				0000-0100	Ukraine, R Ukraine Intl	5905eu	5915eu	6020eu	7180na
0000-0100	Canada, CFRX Toronto	6070do						7240eu	9445na	9550na	12040na
0000-0100	Canada, CFVP Calgary	6030do						12050na			
0000-0100	Canada, CHNX Halifax	6130do				0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	Canada, CKZN St John's	6160do				0000-0059	USA, KHBI N Mariana Is	15665as			
0000-0100	Canada, CKZU Vancouver	6160do				0000-0100	USA, KTNB Salt Lk City UT	15590am			
0000-0100	Costa Rica, Adv World R	5030am	9725am	15460am		0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0100	Costa Rica, RF Peace Intl	6975am	15050am			0000-0100	USA, Voice of America	7215as	9770as	11760as	15185as
0000-0005	Croatia, Croatian Radio	9925am						15290as	17735as	17820as	
0000-0027	Czech Rep, Radio Prague	5930na	7345na			0000-0030 twfha	USA, Voice of America	5995am	6130ca	7405am	9455ca
0000-0100	Ecuador, HCJB	9745na	12015na	21455am				9775am	11695ca	13740am	
0000-0030	Egypt, Radio Cairo	9900am				0000-0100	USA, WEWN Birmingham AL	5825eu			
0000-0100	Germany, Overcomer Ministr	3975eu	9500as			0000-0100 twfha	USA, WGTG McCaysville GA	5085am			
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do			0000-0100	USA, WHRI Noblesville IN	5745am			
0000-0045	India, All India Radio	7410as	9705as	9950as	11620as	0000-0100	USA, WINB Red Lion PA	11950am			
0000-0100	Ireland, Unt Christian BC	6200do				0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0015	Japan, R Japan/NHK World	6155eu	6180eu	9665af	11705na	0000-0100	USA, WRMI/R Miami Intl	9955ca			
		11815as	13650as			0000-0100 mwf	USA, WSHB Cypress Crk SC	7535am	15285sa		
0000-0100	Liberia, LCN/R Liberia Int	5100do				0000-0100 irreg	USA, WWBS Macon GA	11905na			
0000-0100	Malaysia, Radio	7295do				0000-0100	USA, WWCR Nashville TN	5070am	7435am	9475am	13845am
0000-0100 vl	Namibia, NBC	3270af	3289af			0000-0100	USA, WYFR Okeechobee FL	5950na	6085na	9505na	
0000-0030	Netherlands, Radio	6020na	6165na	9845na		0015-0100	Japan, R Japan/NHK World	6155eu	6180eu	9665af	11705na
0000-0100	New Zealand, R NZ Intl	17675pa				0030-0100	Austria, R Austria Intl	9655na			
0000-0057	North Korea, R Pyongyang	11845ca	13650sa	15230na		0030-0100	Iran, VOIRI	6055eu	9022eu	9685eu	
0000-0100 vl	Papua New Guinea, NBC	9675do				0030-0100	Lithuania, Radio Vilnius	9855am			
0000-0100	Philippines, FEBC/R Intl	15450as				0030-0100	Netherlands, Radio	6020na	6165na	9845na	9855as
0000-0030 mtwhfa	Serbia, Radio Yugoslavia	9580na	11870na					11655as	12090as		
0000-0100	Singapore, RCorp Singapore	6150do				0030-0100	Sri Lanka, Sri Lanka BC	9730as	15425as		
0000-0100	Spain, R Exterior Espana	6055am				0030-0100	Thailand, Radio	9655as	11905as	15395na	
0000-0100	Thailand, Radio	9655as	11905as	15395na		0030-0100	UK, BBC Asian Service	9410as	11955as		
						0045-0100	Albania, R Tirana Intl	6115na	7160na		
						0050-0100	Italy, RAI Intl	6010na	9675na	11800na	

SELECTED PROGRAMS

Sundays

- 0000 Australia, Radio: RA News. Five or ten minutes of world, Australian, and regional news.
- 0000 Egypt, Radio Cairo: Stamps.
- 0000 USA, WEWN Birmingham AL: The Best of Mother Angelica Live. Repeat broadcast of a the TV simulcast.
- 0005 Australia, Radio: Oz Sounds #2. Twenty minutes of music selections by Radio Australia announcers.
- 0009 Egypt, Radio Cairo: Egyptian Songs.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Correspondents' Report. The ABC's foreign correspondents report home with Hamish Robertson.
- 0030 VOA (Special English): News (Special English). Five or ten minutes of news in slow English.
- 0040 VOA (Special English): Words and their Stories (Special English). The origin and use of common words and phrases in American English.
- 0045 VOA (Special English): People in America (Special English). Stories about famous Americans.

Mondays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Egypt, Radio Cairo: Egyptian Music.
- 0000 USA, WEWN Birmingham AL: Mother Angelica Live (encore). Down to earth (and sometimes humorous) inspiration.
- 0005 Egypt, Radio Cairo: Islamic Civilization.
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Innovations. Desley Blanch reports on Australian inventions and innovative practices.
- 0030 VOA (Special English): News (Special English). See S 0030.
- 0040 VOA (Special English): Development Report (Special English). Helpful information for developing nations.
- 0045 VOA (Special English): This is America (Special English). Informative reports on life in the United States.

Tuesdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 USA, WEWN Birmingham AL: Pillars of Faith (live). Bishop D. Foley takes telephone questions about Catholic doctrine.
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Arts Australia. Lisa Harris presents reviews and comment on current events within the Australian arts scene.

- 0030 VOA (Special English): News (Special English). See S 0030.
- 0040 VOA (Special English): Agriculture Report (Special English). Developments and reports on farming and agriculture.
- 0045 VOA (Special English): Science in the News (Special English). Recent scientific developments.

Wednesdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 USA, WEWN Birmingham AL: Mother Angelica Live Family Night. A simulcast of the TV program.
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Rural Reporter. No information available.
- 0030 VOA (Special English): News (Special English). See S 0030.
- 0040 VOA (Special English): Science Report (Special English). Developments in the world of science and technology.
- 0045 VOA (Special English): Exploration (Special English). Steve Ember and Shirley Griffith report on space news.

Thursdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Merlin Network One: Rock Radio Network.
- 0000 USA, WEWN Birmingham AL: Mother Angelica Live. See M 0000.
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Book Talk. Jill Kitson presents an entertaining mix of reviews and critical discussion of new books.
- 0030 VOA (Special English): News (Special English). See S 0030.
- 0040 VOA (Special English): Science Report (Special English). See W 0040.
- 0045 VOA (Special English): The Making of a Nation (Special English). Chapters from U.S. history in special English.

Fridays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 USA, WEWN Birmingham AL: Life on the Rock (live). Join Jeff Cavins and his weekly guest as they meet at a coffee house to discuss the joys and challenges of being a young Christian in the 90's.
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Earthbeat. Peter Jacklyn examines environmental issues of the region from a scientific perspective.

- 0030 VOA (Special English): News (Special English). See S 0030.
- 0040 VOA (Special English): Environment Report (Special English). A five-minute report on a specific environmental subject.
- 0045 VOA (Special English): American Mosaic (Special English). Reports about music, books, movies, and student life in the USA.

Saturdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 USA, WEWN Birmingham AL: The Journey Home (live). See W 1400.
- 0005 Australia, Radio: Feedback. See S 0305.
- 0015 Egypt, Radio Cairo: News.
- 0030 Australia, Radio: Asia Pacific. See S 2310.
- 0030 VOA (Special English): News (Special English). See S 0030.
- 0040 VOA (Special English): In the News (Special English). Focus on a person, organization, or issue in news reports.
- 0045 VOA (Special English): American Stories (Special English). Readings of short stories by American authors in slow English.

HAUSER'S HIGHLIGHTS

MALI: CHINA RADIO INTERNATIONAL

RELAY

UTC on 9770 kHz

1830 Arabic

1930 Portuguese

2000 English

UTC on 7170 kHz

2100 English

2130 French

2230 Chinese

2300-2357 Spanish

(Nagoya DX Circle via *Electronic DX Press*)

FREQUENCIES

0100-0200	Anguilla, Caribbean Beacon	6090am				0100-0200	Russia, Voice of Russia WS	7105na	9665na	12050na	15425na
0100-0200	Australia, Radio	9660pa	12080as	15240pa	15415as			15520na			
		17715pa	17750as	17795pa	21740pa	0100-0200	Singapore, RCorp Singapore	6150do			
0100-0200 vl	Australia, VL8K Katherine	5025do				0100-0130	Slovakia, R Slovakia Intl	5930na	7300af	9440sa	
0100-0200 vl	Australia, VL8T Tent Crk	4910do				0100-0200	Spain, R Exterior Espana	6055am			
0100-0200 a	Belarus, R Belarus Intl	7210eu	11670eu			0100-0200	Sri Lanka, Sri Lanka BC	9730as	15425as		
0100-0200	Canada, CBC N Quebec Svc	9625do				0100-0130	Switzerland, Swiss R Intl	9885na	9905ca		
0100-0200	Canada, CFRX Toronto	6070do				0100-0200	UK, BBC Asian Service	5965as	6195as	9410as	9605as
0100-0200	Canada, CFVP Calgary	6030do						11955as	15280as	15310as	15360as
0100-0200	Canada, CHNX Halifax	6130do				0100-0200	UK, BBC World Service	5970sa	5975am	6175na	9590am
0100-0200	Canada, CKZN St John's	6160do						9915sa	12095sa		
0100-0200	Canada, CKZU Vancouver	6160do				0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0129	Canada, R Canada Intl	5960am	9535am	9755am	11715am	0100-0200	USA, KJES Mesquite NM	7555am			
		13670am				0100-0200	USA, KTNB Salt Lk City UT	7510am			
0100-0200	Costa Rica, RF Peace Intl	6975am	15050am			0100-0200	USA, KWHR Naalehu HI	17510as			
0100-0105	Croatia, Croatian Radio	9925am				0100-0200	USA, Voice of America	7115as	7200as	9635as	11705as
0100-0200	Cuba, Radio Havana	6000na	9820na	13605na				11725as	11820as	15250as	17740as
0100-0127	Czech Rep, Radio Prague	6200na	7345na					17820as			
0100-0200	Ecuador, HCJB	9745na	12015na	21455am		0100-0200 twhfa	USA, Voice of America	5995am	6130am	7405am	9445am
0100-0150	Germany, Deutsche Welle	6040na	6035na	6145na	9640na			9775am	13740am		
		11810am				0100-0200	USA, WEWN Birmingham AL	5825eu			
0100-0200	Germany, Overcomer Ministr	3975eu	9500as			0100-0200 twhfa	USA, WGTG McCaysville GA	5085am			
0100-0115	Ghana, Ghana Broad Corp	3366do	4915do			0100-0200	USA, WHRI Noblesville IN	5745am	7315am		
0100-0130	Hungary, Radio Budapest	6120na	9580na			0100-0200	USA, WINB Red Lion PA	11950am			
0100-0200	Indonesia, Voice of	9525as	11765as	15510as		0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0130	Iran, VOIRI	6055eu	9022eu	9685eu		0100-0200	USA, WRMI/R Miami Intl	9955ca			
0100-0200	Ireland, Unt Christian BC	6200do				0100-0200 smwfa	USA, WSHB Cypress Crk SC	7535am	15285sa		
0100-0110	Italy, RAI Intl	6010na	9675na	11800na		0100-0200 irreg	USA, WWBS Macon GA	11905na			
0100-0200	Japan, R Japan/NHK World	6150af	11860as	11870af	15570as	0100-0200	USA, WWCR Nashville TN	3215am	5935am	7435am	13845am
		15590as	17810as	17835sa	21610pa	0100-0200	USA, WYFR Okeechobee FL	6065na	9505na	11550as	
		21670pa				0100-0130	Uzbekistan, R Tashkent	7190as	9375as	9530as	9715as
0100-0200	Liberia, LCN/R Liberia Int	5100do				0100-0127	Vietnam, Voice of	5940am	7250am		
0100-0130	Lithuania, Radio Vilnius	9855am				0125-0200	Netherlands, Radio	9855as	11655as	12090as	
0100-0200	Malaysia, Radio	7295do				0129-0159	Canada, R Canada Intl	5960am	9755am		
0100-0200 vl	Namibia, NBC	3270af	3289af			0129-0159 sm	Canada, R Canada Intl	9535am	11715am	13670am	
0100-0125	Netherlands, Radio	6020na	6165na	9845na	9855as	0130-0200	Albania, R Tirana Intl	6220na	7160na		
		11655as	12090as			0130-0150	Greece, Voice of	7450na	9375na	9420na	11645na
0100-0200	New Zealand, R NZ Intl	17675pa				0130-0200	Sweden, Radio	9435as	11985au		
0100-0200 vl	Papua New Guinea, NBC	9675do				0138-0143	Croatia, Croatian Radio	9925na			
0100-0200	Philippines, FEBC/R Intl	15450as				0140-0200	Vatican State, Vatican R	5980as	7335as	9650as	

SELECTED PROGRAMS

Sundays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. World news from Deutsche Welle.
 0100 USA, WEWN Birmingham AL: St. Joseph Radio Presents (encore). A discussion of Catholic beliefs and practices for all denominations.
 0105 Australia, Radio: The Europeans. Maria Zijlstra presents reports and features on aspects of European politics, culture and society.
 0106 Germany, Deutsche Welle: Weekend Review. A Saturday update of current events and sports in Germany.
 0114 Germany, Deutsche Welle: Spectrum. A magazine program presenting a broad range of new developments in science and technology.

Mondays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. See S 0100.
 0100 USA, WEWN Birmingham AL: The Sacraments. Father Giles Dimock teaches what the sacraments are and practical ways that every Catholic can live them.
 0106 Germany, Deutsche Welle: Mailbag North America. Listener mail from North America is answered.
 0106 Germany, Deutsche Welle: World DX Meeting (4/5). Deutsche Welle's last-day-of-the-month program for shortwave listeners.
 0110 Australia, Radio: Awaye. Lorena Allam hosts a program of indigenous arts and issues.
 0115 Germany, Deutsche Welle: Arts on the Air. A program of reports and interviews on major cultural events and developments hosted by Gareth Evans.
 0115 Germany, Deutsche Welle: Feature of the Month (1). A special feature on important developmental issues of our time.

Tuesdays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. See S 0100.

- 0100 USA, WEWN Birmingham AL: Truth Talks. Deal Hudson of Crisis Magazine and his guests discuss relevant issues, including ethics, charity and democracy.
 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
 0110 Australia, Radio: Science Show. Robyn Williams presents the world of science, both at home and abroad.
 0130 VOA (Special English): News (Special English). See S 0030.
 0133 Germany, Deutsche Welle: Man and Environment. Various topics relating to the environment in industrial and developing countries.
 0140 VOA (Special English): Agriculture Report (Special English). See T 0040.
 0145 VOA (Special English): Science in the News (Special English). See T 0045.

Wednesdays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. See S 0100.
 0100 USA, WEWN Birmingham AL: Our Father's Plan. Dr. Scott Hahn and Jeff Cavins lead an in-depth study of God's relationship to man throughout Biblical history.
 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
 0110 Australia, Radio: National Interest. New program - no info available.
 0130 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the international scene.
 0130 VOA (Special English): News (Special English). See S 0030.
 0140 VOA (Special English): Science Report (Special English). See W 0040.
 0145 VOA (Special English): Exploration (Special English). See W 0045.

Thursdays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. See S 0100.
 0100 USA, WEWN Birmingham AL: LiveWire (live). Live call-in program.
 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
 0110 Australia, Radio: Background Briefing. Australia's top award-winning current affairs program.
 0130 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.

- 0130 VOA (Special English): News (Special English). See S 0030.
 0140 VOA (Special English): Science Report (Special English). See W 0040.
 0145 VOA (Special English): The Making of a Nation (Special English). See H 0045.

Fridays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. See S 0100.
 0100 USA, WEWN Birmingham AL: The Abundant Life. See W 0040.
 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
 0110 Australia, Radio: Hindsight. See H 1605.
 0130 Germany, Deutsche Welle: Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.
 0130 VOA (Special English): News (Special English). See S 0030.
 0140 VOA (Special English): Environment Report (Special English). See F 0040.
 0145 VOA (Special English): American Mosaic (Special English). See F 0045.

Saturdays

- 0100 Australia, Radio: RA News. See S 0000.
 0100 Croatia: News.
 0100 Germany, Deutsche Welle: News. See S 0100.
 0100 USA, WEWN Birmingham AL: The World Over. Divine Worship.
 0105 Australia, Radio: Oz Sounds #1. See S 0005.
 0106 Germany, Deutsche Welle: NewsLink. See M 1106.
 0130 Australia, Radio: Arts Australia. See T 0030.
 0130 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.
 0130 VOA (Special English): News (Special English). See S 0030.
 0140 VOA (Special English): In the News (Special English). See A 0040.
 0145 VOA (Special English): American Stories (Special English). See A 0045.
 0150 USA, WEWN Birmingham AL: Pro-Life Update. See W 1100.

FREQUENCIES

0200-0300	Anguilla, Caribbean Beacon	6090am				0200-0300	South Korea, R Korea Intl	7275am	11715am	11810am	15575am
0200-0300 twhta	Argentina, RAE	11710am				0200-0300	Sri Lanka, Sri Lanka BC	9730as	15425as		
0200-0300	Australia, Radio	9660pa	12080as	15240pa	15415as	0200-0300	Taiwan, Radio Taipei Intl	5950na	7130as	9680na	11740am
		15510pa	17715pa	17750as	21725pa			11825pa	15345as		
0200-0300 vl	Australia, VL8K Katherine	5025do				0200-0300 vl	Tanzania, Radio	5050do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do				0200-0300	UK, BBC African Service	6135af			
0200-0210	Bangladesh, Bangla Betar	4880as				0200-0300	UK, BBC Asian Service	9605as	11955as	15280as	15310as
0200-0300 mwfas	Belarus, R Belarus Intl	7210eu	11670eu					15360as			
0200-0300	Bulgaria, Radio	9485na	11720na			0200-0300	UK, BBC World Service	5970sa	5975am	6175na	6195eu
0200-0300	Canada, CBC N Quebec Svc	9625do						9410eu	9590am	9915sa	
0200-0300	Canada, CFRX Toronto	6070do				0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300	Canada, CFVP Calgary	6030do				0200-0230	USA, KJES Mesquite NM	7555am			
0200-0300	Canada, CHNX Halifax	6130do				0200-0300	USA, KTBG Salt Lk City UT	7510am			
0200-0300	Canada, CKZN St John's	6160do				0200-0300	USA, KWHR Naalehu HI	17510as			
0200-0300	Canada, CKZU Vancouver	6160do				0200-0300	USA, Voice of America	7115as	7200as	11705as	11725as
0200-0229	Canada, R Canada Intl	9535am	9755am	11715am	13670am			11820as	15250as	17740as	17820as
0200-0300	Costa Rica, RF Peace Intl	6975am	15050am	21460am		0200-0300	USA, WEWN Birmingham AL	5825eu			
0200-0205	Croatia, Croatian Radio	9925na				0200-0300 twhta	USA, WGTG McCaysville GA	5085am			
0200-0300	Cuba, Radio Havana	6000na	9820na	13605na		0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	Ecuador, HCJB	9745na	12015na	21455am		0200-0300	USA, WINB Red Lion PA	11950am			
0200-0300	Egypt, Radio Cairo	9475na				0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0230	Finland, VLE/R Finland	9780eu	11900am			0200-0300	USA, WRMI/R Miami Intl	9955ca			
0200-0250	Germany, Deutsche Welle	7285as	9615as	9690as	11945as	0200-0300 mh	USA, WSHB Cypress Crk SC	5850na	7535am		
		11965as	12045as			0200-0300 irreg	USA, WWBS Macon GA	11905na			
0200-0300	Germany, Overcomer Minist	3975eu				0200-0300	USA, WWCR Nashville TN	3215am	5070am	5935am	7435am
0200-0300	Ireland, Unt Christian BC	6200do				0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0300 as/vl	Italy, IRRS	7120va				0215-0225	Nepal, Radio	5005do	7165do		
0200-0300	Kenya, Kenya Broadc Corp	4885do	4935do			0225-0300	Netherlands, Radio	9855as	11655as		
0200-0300	Malaysia, Radio	7295do				0229-0259 sm	Canada, R Canada Intl	9535am	9755am	11715am	13670am
0200-0250	Myanmar, Radio	7185do				0230-0300	Austria, R Austria Intl	9655na	9870sa	13730sa	
0200-0300 vl	Namibia, NBC	3270af	3289af			0230-0257	Czech Rep, Radio Prague	9480me	11600as		
0200-0225	Netherlands, Radio	9855as	11655as	12090as		0230-0300	Hungary, Radio Budapest	9840na	11910na		
0200-0300	New Zealand, R NZ Intl	17675pa				0230-0245	Pakistan, Radio	7485as	13610as	15485as	
0200-0230 m	Norway, Radio Norway Intl	11600as	11990na			0230-0300 vl	Philippines, R Pilipinas	11885as	15120as	15270as	
0200-0300 vl	Papua New Guinea, NBC	9675do				0230-0300	Sweden, Radio	7135am	9495am		
0200-0300	Romania, R Romania Intl	6155na	9570na	9690as	11740as	0230-0300	UK, BBC World Service	9895am			
		11940as	15380as			0230-0300	Vietnam, Voice of	5940am			
0200-0300	Russia, Voice of Russia WS	7105na	9665na	12050na	15425na	0250-0300 sf	Greece, Voice of	7450na	9375na	9420na	11645na
		15520na				0250-0300	Vatican State, Vatican R	7305ca	9605am		
0200-0300	Singapore, R Corp Singapore	6150do									

SELECTED PROGRAMS

Sundays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 USA, WEWN Birmingham AL: St. Joseph Radio Presents (encore) (Part 2). The second hour of a discussion of Catholic beliefs and practices for all denominations.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: Weekend Review. See S 0106.
 0210 Australia, Radio: Fine Music Australia. The best Australian fine music performances and compositions are presented by Ivan Lloyd.
 0214 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.
 0215 Egypt, Radio Cairo: News.
 0230 Australia, Radio: The Religion Report. Hosted by John Cleary.

Mondays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 Norway, Radio Norway Intl: Norway Now. See S 0600.
 0200 USA, WEWN Birmingham AL: The Teachings of Jesus Christ. Father John Corapi explains the parables and teachings of Jesus Christ.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: Weekend Review Two. A Sunday update of current events in Germany.
 0210 Australia, Radio: The World Today (Part 1). Tony Eastley with current affairs updates.
 0215 Egypt, Radio Cairo: News.
 0215 Germany, Deutsche Welle: Marks and Markets. See S 0515.
 0225 Egypt, Radio Cairo: Commentary.
 0230 Egypt, Radio Cairo: Music.

Tuesdays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 USA, WEWN Birmingham AL: Catholic World Today. See M 0600.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
 0210 Australia, Radio: The World Today (Part 1). See M 0210.
 0215 Egypt, Radio Cairo: News.
 0225 USA, WEWN Birmingham AL: Today's Saint. A short biography of a saint whose feastday is being celebrated.

- 0228 USA, WEWN Birmingham AL: Pro-Life Issues. See M 2328.
 0230 Germany, Deutsche Welle: Man and Environment. See T 0133.
 0230 USA, WEWN Birmingham AL: IMRA Report on Missionaries. Father Mike Mullen reports from St. John's University in New York.

Wednesdays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 USA, WEWN Birmingham AL: Catholic World Today. See M 0600.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
 0210 Australia, Radio: The World Today (Part 1). See M 0210.
 0215 Egypt, Radio Cairo: News.
 0228 USA, WEWN Birmingham AL: Parenting Children and Teens. Steve Wood offers practical guidelines for strengthening families.
 0230 Germany, Deutsche Welle: Insight. See W 0130.

Thursdays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 USA, WEWN Birmingham AL: Catholic World Today. See M 0600.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
 0210 Australia, Radio: The World Today (Part 1). See M 0210.
 0215 Egypt, Radio Cairo: News.
 0225 USA, WEWN Birmingham AL: Today's Saint. See T 0225.
 0230 USA, WEWN Birmingham AL: Pro-Life Issues. See M 2328.
 0230 Germany, Deutsche Welle: Living in Germany. See H 0130.
 0230 USA, WEWN Birmingham AL: Moral Decisions. Divine Worship.

Fridays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 USA, WEWN Birmingham AL: Catholic World Today. See M 0600.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
 0210 Australia, Radio: The World Today (Part 1). See M 0210.

- 0215 Egypt, Radio Cairo: News.
 0228 USA, WEWN Birmingham AL: Crisis Magazine. See H 1100.
 0230 Germany, Deutsche Welle: Spotlight on Sport. See F 0130.

Saturdays

- 0200 Australia, Radio: RA News. See S 0000.
 0200 Germany, Deutsche Welle: News. See S 0100.
 0200 USA, WEWN Birmingham AL: Catholic World Today. See M 0600.
 0205 Australia, Radio: Ockham's Razor. See S 0605.
 0205 Croatia: News.
 0206 Germany, Deutsche Welle: NewsLink. See M 1106.
 0215 Egypt, Radio Cairo: News.
 0228 USA, WEWN Birmingham AL: 2000 - The Great Jubilee. Divine Worship.
 0230 Australia, Radio: The Health Report. See M 1530.
 0230 Germany, Deutsche Welle: German by Radio. See A 0130.

HAUSER'S HIGHLIGHTS
AUSTRALIA: RADIO AUSTRALIA

Revised sked in late June, English toward NAM:

UTC	KHz
2100-0200	21740
2100-0800	17715
2200-0200	17795
0200-0900	15510
0800-2100	9580
1200-1400	6020
1400-1800	5995
1700-2200	11880

(Nigel Holmes, RA)

FREQUENCIES

0400-0500	Anguilla, Caribbean Beacon	6090am				0400-0500	UK, BBC African Service	3255af	6005af	6190af	7160af
0400-0500	Australia, Radio	9660pa	12080as	15240pa	15415as	0400-0500	UK, BBC Asian Service	9605as	11955as	15280as	15310as
		15510pa	17715pa	17750as	21725pa			17790as	21660as		
0400-0500 vl	Australia, VL8K Katherine	5025do				0400-0430	UK, BBC World Service	3955eu	5975am	6175na	6180eu
0400-0500 vl	Australia, VL8T Tent Crk	4910do						6195eu	9410eu	9895am	11760me
0400-0500	Australia, Defense Forces R	15635as				0400-0500	USA, KAIJ Dallas TX	12095eu	15575as	17640eu	
0400-0500	Canada, CBC N Quebec Svc	9625do				0400-0500	USA, KATN Salt Lk City UT	5810am			
0400-0500	Canada, CFRX Toronto	6070do				0400-0500	USA, KVOH Los Angeles CA	7510am			
0400-0500	Canada, CFVP Calgary	6030do				0400-0500	USA, KWHR Naalehu HI	9975am			
0400-0500	Canada, CHNX Halifax	6130do				0400-0500	USA, Voice of America	17780as			
0400-0500	Canada, CKZN St John's	6160do						6080af	7170af	7265af	7275af
0400-0500	Canada, CKZU Vancouver	6160do						7290af	9575af	9885af	11965me
0400-0429	Canada, R Canada Intl	9715me	11835me	11975me				15205va			
0400-0500	China, China Radio Intl	9560na	9730am			0400-0500	USA, WEWN Birmingham AL	5825eu			
0400-0500	Costa Rica, RF Peace Intl	6975am	15050am			0400-0500 twtfa	USA, WGTG McCaysville GA	5085am			
0400-0405	Croatia, Croatian Radio	5945eu				0400-0500	USA, WHRA Greenbush ME	9400me			
0400-0500	Cuba, Radio Havana	6000na	9820na	13605na		0400-0500	USA, WHRI Noblesville IN	5745am	7315am		
0400-0500	Ecuador, HCJB	9745na	12015am	21455am		0400-0500	USA, WINB Red Lion PA	11950am			
0400-0450	Germany, Deutsche Welle	5990af	6015af	7225af	9565af	0400-0500	USA, WJCR Upton KY	7490na	13595na		
		11765af				0400-0500	USA, WMLK Bethel PA	9465am			
0400-0500	Germany, Overcomer Ministr	3975eu	11910as			0400-0500 mtwhfa	USA, WRMI/R Miami Intl	9955ca			
0400-0500 vl	Guatemala, Radio Cultural	3300do				0400-0500 mw	USA, WSHB Cypress Crk SC	7535eu	9840af		
0400-0500	Ireland, Unt Christian BC	6200do				0400-0500	USA, WWCN Nashville TN	3210am	5070am	5935na	7435am
0400-0415	Israel, Kof Israel	9435eu	11605eu	17535na		0400-0500	USA, WYFR Okeechobee FL	6065na	9505na	9985va	
0400-0500 as/vl	Italy, IRRS	7120va				0400-0500	Zambia, Christian Voice	3330af	6065af		
0400-0500	Kenya, Kenya Broadc Corp	4885do	4935do			0400-0500	Zambia, Natl BC Corp	6165do	6265do		
0400-0410 vl/m-f	Malawi, MBC	5993do				0400-0500 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0400-0500	Malaysia, Radio	7295do				0425-0440 vl	Italy, RAI Intl	5975af	7270af		
0400-0500 vl	Malaysia, RTM Kuching	7160do				0425-0500	Nigeria, FRCN/Radio	3326do	4770do	4990do	6025do
0400-0430 mtwhf	Mexico, Radio Mexico Intl	5985na	9705na			0430-0500	Austria, R Austria Intl	6155eu	13730eu		
0400-0425	Moldova, R Moldova Intl	7520na				0430-0500 vl	Lesotho, Radio Lesotho	4800do			
0400-0500	New Zealand, R NZ Intl	17675pa				0430-0500	Netherlands, Radio	6165na	9590na		
0400-0430 m	Norway, Radio Norway Intl	9445na				0430-0500	Serbia, Radio Yugoslavia	9580na	11870na		
0400-0500 vl	Papua New Guinea, NBC	9675do				0430-0500	Swaziland, Trans World R	3200af	4775af		
0400-0500	Romania, R Romania Intl	9570na	11940na	15325as	17720as	0430-0500	Switzerland, Swiss R Intl	9885na	9905na		
0400-0500	Russia, Voice of Russia WS	9665na	9825na	12000na	12050na	0430-0500	UK, BBC World Service	5975am	6175am	11760me	15575as
		13645na	13790na	15455na	15495na			17640me			
0400-0430	S Africa, Channel Africa	5955af				0430-0500 as	UK, BBC World Service	3955eu	6180eu	6195eu	9410eu
0400-0500	Singapore, R Corp Singapore	6150do						12095eu			
0400-0430	Sri Lanka, Sri Lanka BC	9730as	15425as			0455-0500	Malaysia, Voice of	6175as	9750as	15295au	
0400-0430	Switzerland, Swiss R Intl	5840eu	6165eu	9885am	9905am	0455-0500	Nigeria, Voice of	7255af	15120af		
0400-0500 vl	Tanzania, Radio	5050do									
0400-0415	Uganda, Radio	4976do									

SELECTED PROGRAMS

Sundays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 USA, WEWN Birmingham AL: Teaching of Jesus. Father Groeschel hosts this series.
 0405 Australia, Radio: Pacific Focus. Coverage of issues of relevance to people of the Pacific region.
 0406 Germany, Deutsche Welle: Weekend Review. See S 0106.
 0414 Germany, Deutsche Welle: Inside Europe. Helen Seeny, a native of Australia, hosts this radio magazine that offers a European perspective on events of the week.
 0430 Australia, Radio: Week's End. No information available for this new program.

Mondays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 Norway, Radio Norway Intl: Norway Now. See S 0600.
 0400 USA, WEWN Birmingham AL: Spanish Mass (encore). See S 1600.
 0406 Germany, Deutsche Welle: Weekend Review Two. See M 0206.
 0410 Australia, Radio: The World Today (Part 3). See M 0210.
 0415 Germany, Deutsche Welle: Marks and Markets. See S 0515.

Tuesdays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 USA, WEWN Birmingham AL: The Sacraments. See M 0100.
 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
 0410 Australia, Radio: The World Today (Part 3). See M 0210.
 0430 Germany, Deutsche Welle: Good Morning Africa. Music, gossip and listeners' messages for and from Africa.

Wednesdays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 USA, WEWN Birmingham AL: The Abundant Life. Johnnette Benkovic with challenging subjects dealing with improving family life.
 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
 0410 Australia, Radio: The World Today (Part 3). See M 0210.
 0430 Germany, Deutsche Welle: Good Morning Africa. See T 0430.

Thursdays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 USA, WEWN Birmingham AL: Mother Angelica Live (encore). See M 0000.
 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
 0410 Australia, Radio: The World Today (Part 3). See M 0210.
 0430 Germany, Deutsche Welle: Good Morning Africa. See T 0430.

Fridays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 USA, WEWN Birmingham AL: Mother Angelica Live (encore). See M 0000.
 0406 Germany, Deutsche Welle: NewsLink. See M 1106.
 0410 Australia, Radio: The World Today (Part 3). See M 0210.
 0430 Germany, Deutsche Welle: Good Morning Africa. See T 0430.

Saturdays

- 0400 Australia, Radio: RA News. See S 0000.
 0400 Croatia: News.
 0400 Germany, Deutsche Welle: News. See S 0100.
 0400 USA, WEWN Birmingham AL: Pillars of Faith (encore). See T 0000.
 0405 Australia, Radio: Pacific Focus. See S 0405.
 0406 Germany, Deutsche Welle: NewsLink. See M 1106.

- 0430 Australia, Radio: Asia Pacific. See S 2310.
 0430 Germany, Deutsche Welle: German by Radio. See A 0130.

NEW ZEALAND: RADIO NEW ZEALAND INT'L

07 September 25 October 1998

	UTC	kHz
Mon-Fri	1650-1751	6145
Sun-Thu	1752-1951	11675
Fri-Sat	1752-1958	"
Sun-Thu	1952-0716	17675
Fri-Sat	1959-0716	
Mon-Fri	0716-1015	9700
Sat & Sun	0716-1015	"
OFF-AIR	1015-1650	
Occasional use for sporting broadcasts		
	1206-1650	6100

• RNZI's News from NZ and the Pacific can be heard via World Radio Network 1 (www.wrn.org) at these times UTC:

Europe	1500	Sat
USA	1800	Sat
Africa/Asia	0500	Sun

FREQUENCIES

0500-0600	Anguilla, Caribbean Beacon	6090am				0500-0530	S Africa, Channel Africa	9525af			
0500-0600	Australia, Radio	9660pa	12080as	15240pa	15510pa	0500-0600	Singapore, RCorp Singapore	6150do			
		17715pa	21820pa			0500-0600	Spain, R Exterior Espana	6055am			
0500-0600 vi	Australia, VL8K Katherine	5025do				0500-0600 vi	Tanzania, Radio	5050do			
0500-0600 vi	Australia, VL8T Tent Crk	4910do				0500-0515	Uganda, Radio	4976do			
0500-0600	Australia, Defense Forces R	15635as				0500-0600	UK, BBC African Service	3255af	6005af	6190af	7160af
0500-0600 vi	Cameroon, Radio Cameroon	4850do						9600af	15420af	17885af	
0500-0600	Canada, CBC N Quebec Svc	9625do				0500-0600	UK, BBC Asian Service	9740as	11955as	15280as	15310as
0500-0600	Canada, CFRX Toronto	6070do						15360as	17760as	17790as	21660as
0500-0600	Canada, CFVP Calgary	6030do				0500-0600	UK, BBC World Service	3955eu	5975am	6175am	6180eu
0500-0600	Canada, CHNX Halifax	6130do						6195eu	9410eu	11760me	12095eu
0500-0600	Canada, CKZU Vancouver	6160do						15575eu	17640me		
0500-0529 mtwhf	Canada, R Canada Intl	7295eu	9595eu	11835af	15430af	0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600	Costa Rica, RF Peace Intl	6975am	15050am			0500-0600	USA, KTVB Salt Lk City UT	7510am			
0500-0505	Croatia, Croatian Radio	5934eu	9830eu	13830au		0500-0600	USA, KVOH Los Angeles CA	9975ca			
0500-0600	Cuba, Radio Havana	9550na	9820na	9830na		0500-0600	USA, KWHR Naalehu HI	17780as			
0500-0600	Ecuador, HCJB	9745na	12015na	21455am		0500-0600	USA, Voice of America	5970af	6035af	6080af	7170eu
0500-0550	Germany, Deutsche Welle	6045na	6185na	9615am	11810na			7195af	9630af	11965me	12080af
0500-0600	Germany, Overcomer Ministr	3975eu	11910as					15205eu			
0500-0600	Ireland, Unt Christian BC	6200do				0500-0600	USA, WHRA Greenbush ME	11565af			
0500-0600 vi	Italy, IRRS	3985va				0500-0600	USA, WHRI Noblesville IN	5745am	7315am		
0500-0600	Japan, R Japan/NHK World	6110na	7230eu	9835na	11715as	0500-0600	USA, WINB Red Lion PA	11950am			
		11760as	11840as	11850pa	15230pa	0500-0600	USA, WJCR Upton KY	7490na	13595na		
		17810as				0500-0600	USA, WMLK Bethel PA	9465am			
0500-0600	Kenya, Kenya Broadc Corp	4885do	4935do			0500-0600 mtwhf	USA, WRMU Miami Intl	9955ca			
0500-0530 vi	Lesotho, Radio Lesotho	4800do				0500-0600 mw	USA, WSHB Cypress Crk SC	7535eu	9835af		
0500-0600	Liberia, Star Radio	3400do				0500-0600	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0500-0600	Liberia, LCN/R Liberia Int	5100do				0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580af	
0500-0510 vi/m-f	Malawi, MBC	5993do				0500-0530	Vatican State, Vatican R	4005eu	5883eu	7250eu	9660af
0500-0600	Malaysia, Radio	7295do						11625af	15570af		
0500-0600 vi	Malaysia, RTM Kuching	4895do	7160do			0500-0600	Zambia, Christian Voice	3330af	6065af		
0500-0600	Malaysia, Voice of	6175as	9750as	15295au		0500-0600	Zambia, Natl BC Corp	6165do			
0500-0600 vi	Namibia, NBC	3270af	3289af			0500-0530 vi	Zimbabwe, Zimbabwe BC	3306do	4828do		
0500-0525	Netherlands, Radio	6165na	9590na			0505-0600	Swaziland, Trans World R	3200af	4775af	9500af	
0500-0600	New Zealand, R NZ Intl	11690pa				0520-0530	Vatican State, Vatican R	9660af	11625af	15570af	
0500-0505	Nigeria, FRCN/Radio	3326do	4770do	4990do		0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0500-0600	Nigeria, Voice of	7255af	15120af			0530-0600	Austria, R Austria Intl	6015na			
0500-0557	North Korea, R Pyongyang	3560eu	11710eu	13790eu		0530-0600	Switzerland, Swiss R Intl	5840eu	6165eu		
0500-0600 vi	Papua New Guinea, NBC	9675do				0530-0600	Thailand, Radio	9655eu	11905eu	15115eu	
0500-0600	Russia, Voice of Russia WS	9450au	17495au	17665au	21760au	0530-0600	UAE, Radio Dubai	17830eu	21700eu		
		21790au				0530-0600 vi	Zimbabwe, Zimbabwe BC	4828do	5012do		
0500-0530	S Africa, AWR Africa	6000af	6100af								

SELECTED PROGRAMS

Sundays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0505 Australia, Radio: Oz Sounds #1. See S 0005.
- 0506 Germany, Deutsche Welle: Weekend Review. See S 0106.
- 0515 Germany, Deutsche Welle: Marks and Markets. Germany's role in world trade.
- 0530 Australia, Radio: Media Report. Agnes Warren presents the inside story on how the communications industry operates and puts the spotlight on media people and their activities.

Mondays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0506 Germany, Deutsche Welle: Mailbag. See S 0214.
- 0510 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 1). The afternoon magazine that provides a focus on the people and issues of the region.
- 0515 Germany, Deutsche Welle: COOL. See S 1115.
- 0530 Australia, Radio: Sport. Five or ten minutes of sports news.
- 0540 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 2). See M 0510.

Tuesdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0510 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 1). See M 0510.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Germany, Deutsche Welle: Man and Environment. See T 0133.

- 0540 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 2). See M 0510.

Wednesdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0510 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 1). See M 0510.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Germany, Deutsche Welle: Insight. See W 0130.
- 0540 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 2). See M 0510.

Thursdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0510 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 1). See M 0510.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Germany, Deutsche Welle: Living in Germany. See H 0130.
- 0540 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 2). See M 0510.

Fridays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0510 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 1). See M 0510.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Germany, Deutsche Welle: Spotlight on Sport. See F 0130.
- 0540 Australia, Radio: Pacific Beat (Afternoon Edition) (Part 2). See M 0510.

Saturdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Croatia: News.
- 0500 Germany, Deutsche Welle: News. See S 0100.
- 0505 Australia, Radio: Oz Sounds #2. See S 0005.
- 0506 Germany, Deutsche Welle: NewsLink. See M 1106.
- 0530 Australia, Radio: The Sports Factor. See M 2330.
- 0530 Germany, Deutsche Welle: German by Radio. See A 0130.

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FREQUENCIES

September 1998 MONITORING TIMES 47

FREQUENCIES

1100-1200	Anguilla, Caribbean Beacon	11775am				1100-1200	Switzerland, Swiss R Intl	9810as	17515as		
1100-1200	Australia, Radio	6080as	9580pa			1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200 vl	Australia, VL8A Alice Spg	2310do				1100-1200 vl	Tanzania, Radio	5050do			
1100-1200 vl	Australia, VL8K Katherine	2485do				1100-1200	UK, BBC African Service	6190af	11940af	15400af	17830af
1100-1200 vl	Australia, VL8T Tent Crk	2325do						17885af	21660af		
1100-1200	Bulgaria, Radio	15175eu	17585eu			1100-1200	UK, BBC Asian Service	6195as	9580as	9740as	11955as
1100-1200	Canada, CFRX Toronto	6070do						15280as	15310as	17785as	
1100-1200	Canada, CFVP Calgary	6030do				1100-1130 mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1100-1200	Canada, CHNX Halifax	6130do				1100-1130	UK, BBC World Service	5965na	9410eu	11760me	12095eu
1100-1200	Canada, CKZU St John's	6160do						15485eu	15565eu	15575eu	17640eu
1100-1200	Canada, CKZU Vancouver	6160do						17705eu	17790sa		
1100-1200	Costa Rica, RF Peace Intl	6975am				1100-1130 as	UK, BBC World Service	6195am	15190sa	15220am	
1100-1200	Ecuador, HCJB	12005ca	15115am	21455am		1100-1200	USA, KAIJ Dallas TX	5810am			
1100-1200 as	Eqt Guinea, R East Africa	15186af				1100-1200	USA, KHBI N Mariana Is	9385au	15665as		
1100-1200	Eqt Guinea, Radio Africa	9530as				1100-1200	USA, KTNB Salt Lk City UT	7510am			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af	1100-1200	USA, KWHR Naalehu HI	9930as	11565pa		
1100-1200	Germany, Sunrise Radio	5850va				1100-1200	USA, Voice of America	5985pa	6160as	9645as	9760as
1100-1200 as	Germany, Overcomer Ministr	5900eu						11720as	15160as	15425as	
1100-1200	Germany, Overcomer Ministr	15375as	15715au	17505pa		1100-1200	USA, WEWN Birmingham AL	7425na	9465na	15745eu	
1100-1200	Iran, VOIRI	11830as	11875as	13605me	15260as	1100-1200 mtwhf	USA, WGTG McCaysville GA	9400am			
1100-1200	Ireland, Unt Christian BC	6200do				1100-1200	USA, WHRI Noblesville IN	6040am	9495am		
1100-1200 as/vl	Italy, IRRS	7120va				1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	Japan, R Japan/NHK World	6120na	9695as	11730as		1100-1200	USA, WRM/R Miami Intl	9955ca			
1100-1200	Jordan, Radio	11690eu				1100-1200 wf	USA, WSHB Cypress Crk SC	6095na	9455sa		
1100-1120 fa	Kazakhstan, R Almaty Intl	9505eu	9620eu	11720as		1100-1200	USA, WWCN Nashville TN	5070am	5935am	7435am	15685am
1100-1200	Kenya, Kenya Broadc Corp	4935do				1100-1200 mtwhf	USA, WYFR Okeechobee FL	5950na			
1100-1110	Liberia, LCNR/Liberia Int	5100do				1100-1200	USA, WYFR Okeechobee FL	5850na			
1100-1200	Malaysia, Radio	7295do				1100-1130	Vietnam, Voice of	7285as	9730as		
1100-1200 irreg	Malaysia, RTM Kota Kinabalu	5980do				1100-1200	Zambia, Christian Voice	6065af			
1100-1200 vl	Namibia, NBC	4930af	4965af			1100-1200	Zambia, Natl BC Corp	6165do	6265do		
1100-1125	Netherlands, Radio	6045eu	9860eu	12065as	13710as	1100-1200 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1100-1200	New Zealand, R NZ Intl	6100pa				1105-1120	Pakistan, Radio	15530eu	17835eu		
1100-1157	North Korea, R Pyongyang	3560as	9640af	9975me	11335va	1120-1140 w	Kazakhstan, R Almaty Intl	9505eu	9620eu	11720as	
		15230va				1125-1200	Netherlands, Radio	6045eu	9860eu		
1100-1130 as	Palau, KHBN/Voice of Hope	9965as				1130-1200	Sweden, Radio	15235am	15240am	17870am	
1100-1200 vl	Papua New Guinea, NBC	4890do				1130-1200 as	UK, BBC Asian Service	15310as	17785as		
1100-1200	Singapore, R Singapore Int	6015as	6150as			1130-1200	UK, BBC World Service	6195am	15220am		
1100-1130 vl	Solomon Islands, SIBC	5020do				1130-1200	USA, Voice of America	11680eu			
1100-1200	South Korea, R Korea Intl	7275as				1130-1200 f	Vatican State, Vatican R	15595va	17550va		
1100-1130	Sri Lanka, Sri Lanka BC	11835as	15120as	17850as		1140-1200 t	Kazakhstan, R Almaty Intl	9505eu	9620eu	11720as	

SELECTED PROGRAMS

Sundays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: Reflections on the Sacraments. Father Pavone.
 1105 Australia, Radio: Jazz Notes. The best of Australian jazz is introduced by Ivan Lloyd.
 1106 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.
 1115 Germany, Deutsche Welle: COOL. NEW! A youth Magazine.
 1130 Australia, Radio: Week's End. See S 0430.
 1130 USA, WEWN Birmingham AL: The Catholic Broadcast. Sandra McDevitt hosts a program of inspirational stories, music, interviews, and scripture readings.

Mondays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: The Spirituality of the Catholic Church. Father Paul Keenan teaches on God and man and the new catechism of the Catholic Church.
 1106 Germany, Deutsche Welle: NewsLink. Global current affairs as seen from the heart of Europe.
 1110 Australia, Radio: Asia Pacific (repeat). See S 2310.
 1130 Australia, Radio: Sport. See M 0530.
 1130 Germany, Deutsche Welle: Africa Report. Reports and background to the news from Africa by Deutsche Welle correspondents.
 1130 USA, WEWN Birmingham AL: Morning Prayer. A half-hour of devotion to begin the day.
 1135 Australia, Radio: Countrywide. Shane Mahony with daily issues in primary industry.

Tuesdays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: You Better Believe It. Fr. Ken Roberts gives straight-on answers to teens who wish to share (need to share) their questions, doubts, friendship and love.

- 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1110 Australia, Radio: Asia Pacific (repeat). See S 2310.
 1130 Australia, Radio: Sport. See M 0530.
 1130 Germany, Deutsche Welle: Africa Report. See M 1130.
 1130 USA, WEWN Birmingham AL: Morning Prayer. See M 1130.
 1135 Australia, Radio: Countrywide. See M 1135.

Wednesdays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: Pro-Life Update. Father Frank Pavone speaks out against abortion.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1110 Australia, Radio: Asia Pacific (repeat). See S 2310.
 1130 Australia, Radio: Sport. See M 0530.
 1130 Germany, Deutsche Welle: Africa Report. See M 1130.
 1130 USA, WEWN Birmingham AL: Morning Prayer. See M 1130.
 1135 Australia, Radio: Countrywide. See M 1135.

Thursdays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: Crisis Magazine. NEW! Host Deal Hudson probes current issues from a distinctly Catholic perspective.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1110 Australia, Radio: Asia Pacific (repeat). See S 2310.
 1130 Australia, Radio: Sport. See M 0530.
 1130 Germany, Deutsche Welle: Africa Report. See M 1130.
 1130 USA, WEWN Birmingham AL: Morning Prayer. See M 1130.
 1135 Australia, Radio: Countrywide. See M 1135.

Fridays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: Answering Common Objections. Scott Hahn explains and defends the teachings of the Catholic faith.
 1106 Germany, Deutsche Welle: NewsLink. See M 1106.
 1110 Australia, Radio: Asia Pacific (repeat). See S 2310.

- 1130 Australia, Radio: Sport. See M 0530.
 1130 Germany, Deutsche Welle: Africa Report. See M 1130.
 1130 USA, WEWN Birmingham AL: Morning Prayer. See M 1130.
 1135 Australia, Radio: Countrywide. See M 1135.

Saturdays

- 1100 Australia, Radio: RA News. See S 0000.
 1100 Germany, Deutsche Welle: News. See S 0100.
 1100 USA, WEWN Birmingham AL: St. Francis - Mirror of Christ. See W 2300.
 1105 Australia, Radio: Fine Music Australia. See S 0210.
 1106 Germany, Deutsche Welle: Talking Point. Journalists discuss major trends and events.
 1130 Australia, Radio: Book Reading. See F 2305.
 1130 Germany, Deutsche Welle: African Kaleidoscope. A weekly review of trends and events on the African continent.
 1130 USA, WEWN Birmingham AL: Kids Sing-A-Long. Adrianne teaches, through joyous music, about the Catholic faith.

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FREQUENCIES

1400-1500	Anguilla, Caribbean Beacon	11775am				1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Australia, Radio	5995pa	6020pa	6080as	9580pa	1400-1500	Russia, Voice of Russia WS	4730as	4940as	4975as	7510as
		9660pa						11655as	12025as	15510as	17570as
1400-1500 vl	Australia, VL8A Alice Spg	2310do				1400-1455 as	S Africa, Channel Africa	9445af	17675af	17870af	
1400-1500 vl	Australia, VL8K Katherine	2485do				1400-1500	Singapore, RCorp Singapore	6150do			
1400-1500 vl	Australia, VL8T Tent Crk	2325do				1400-1500	Sri Lanka, Sri Lanka BC	9730as	15425as		
1400-1500 vl	Canada, CBC N Quebec Svc	9625do				1400-1500	Switzerland, Swiss R Intl	9575as	15265as		
1400-1500	Canada, CFRX Toronto	6070do				1400-1500 vl	Tanzania, Radio	5050do			
1400-1500	Canada, CFVP Calgary	6030do				1400-1430	Thailand, Radio	9655as	9830as	11905as	
1400-1500	Canada, CHNX Halifax	6130do				1400-1500	UK, BBC African Service	6190af	11940af	17830af	21490af
1400-1500	Canada, CKZN St John's	6160do						21660af			
1400-1500	Canada, CKZU Vancouver	6160do				1400-1500	UK, BBC Asian Service	5990as	6195as	9740as	11750as
1400-1500 s	Canada, R Canada Intl	11855am	13650am					15310as			
1400-1500	China, China Radio Intl	7260as	7405na	9535as	9700as	1400-1500	UK, BBC World Service	9410eu	9515na	11865na	12095eu
		11825as						15220na	15485eu	15565eu	15575eu
		11825as						17640eu	17705eu	17840am	
1400-1500	Costa Rica, RF Peace Intl	6975am	21460am			1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	Ecuador, HCJB	12005ca	15115am	21455am		1400-1500	USA, KHBI N Mariana Is	9355as			
1400-1500 as	Eqt Guinea, R East Africa	15186af				1400-1500	USA, KJES Mesquite NM	11715am			
1400-1500	France, Radio France Intl	11910as	15405as	17560af		1400-1500	USA, KTNB Salt Lk City UT	7510am			
1400-1500	Georgia, Voice of Hope	15715as				1400-1500	USA, KWHR Naalehu HI	9930as	11565pa		
1400-1500	Germany, Sunrise Radio	5850va				1400-1500	USA, Voice of America	6160as	7125as	7215as	9645as
1400-1430 s	Germany, Universal Life	9955na						9760as	15160as	15255va	15395as
1400-1500	Germany, Overcomer Ministr	13810me	15625pa					15425as			
1400-1500	India, All India Radio	9545as	11620as	13710as		1400-1500	USA, WEWN Birmingham AL	9455na	11875na	15745eu	
1400-1500	Ireland, Unt Christian BC	6200do				1400-1500 mtwhfa	USA, WGTG McCaysville GA	9400am			
1400-1430	Israel, Kol Israel	12535eu	15640na			1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500 as/vl	Italy, IRRS	7120va				1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	Japan, R Japan/NHK World	9505na	11730as	11880af		1400-1500 as	USA, WRMI/R Miami Intl	9955ca			
1400-1500	Jordan, Radio	11690eu				1400-1500	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400-1500	Kenya, Kenya Broadc Corp	4935do				1400-1500	USA, WYFR Okeechobee FL	11502as	11830na	11970na	17750na
1400-1500	Malaysia, Radio	7295do				1400-1405	Vatican State, Vatican R	13765au	15540au		
1400-1500 vl	Malaysia, RTM Kuching	4895do	7160do			1400-1500	Zambia, Christian Voice	6065af			
1400-1500 irreg	Malaysia, RTM Kota Kinabalu	5980do				1400-1500	Zambia, Natl BC Corp	6165do	6265do		
1400-1430	Mexico, Radio Mexico Intl	5985na	9705na			1400-1500 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1400-1500 vl	Namibia, NBC	4930af	4965af			1415-1425	Nepal, Radio	5005do	7165do		
1400-1500	Netherlands, Radio	9890as	15585as			1430-1500	Australia, Radio	9500as	11660as		
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa				1430-1500	Guam, AWR/KSDA	9385as			
1400-1410	Pakistan, Radio	9650as	11570me	15170af		1430-1500	Mongolia, Voice of	9720as	12085as		
1400-1500 as	Palau, KHBN/Voice of Hope	9985as				1430-1500	Myanmar, Radio	5986do			
1400-1500 vl	Papua New Guinea, NBC	4890do									

SELECTED PROGRAMS

Sundays

- 1400 Australia, Radio: RA News. See S 0000.
 1400 China, China Radio Intl: News. A ten-minute summary of world news.
 1400 USA, WEWN Birmingham AL: Life on the Rock (encore). Jeff Cavins and his weekly guest as they meet at a coffee house to discuss the joys and challenges of being a young Christian in the 90's.
 1405 Australia, Radio: Other Worlds (Part 1). Brent Clough plays late night lounge music (1st hour).
 1411 China, China Radio Intl: News about China. Ten minutes of home news.
 1413 China, China Radio Intl: Sports Beat. News from the world of sports.
 1420 China, China Radio Intl: China Snapshots. A tour around cities and town in China with focus on local flavor and customs.
 1425 China, China Radio Intl: Report on Developing Countries. A report on projects in the Third World.
 1435 China, China Radio Intl: Song of the Week. A selection of the new pop music in China.
 1445 China, China Radio Intl: Voices from Other Lands. A cultural program about the world and its people.

Mondays

- 1400 Australia, Radio: RA News. See S 0000.
 1400 China, China Radio Intl: News. See S 1400.
 1400 USA, WEWN Birmingham AL: Teaching of Jesus. See S 0400.
 1405 Australia, Radio: The Planet (Part 2). See M 1315.
 1411 China, China Radio Intl: News about China. See S 1411.
 1420 China, China Radio Intl: Current Affairs. An in-depth look at events and happenings in China.
 1425 China, China Radio Intl: Press Clippings. Several items from the Chinese press.
 1430 China, China Radio Intl: China's Open Windows. Focus on a particular area of investment in China.
 1434 China, China Radio Intl: Changzhou Reports. A look at this industrial city in East China's Jiangsu Province and the

- people who live and work there.
 1445 China, China Radio Intl: Idioms and Their Stories. A regular feature for students studying Chinese.
Tuesdays
 1400 Australia, Radio: RA News. See S 0000.
 1400 China, China Radio Intl: News. See S 1400.
 1400 USA, WEWN Birmingham AL: Truth Talks. See T 0100.
 1405 Australia, Radio: The Planet (Part 2). See M 1315.
 1411 China, China Radio Intl: News about China. See S 1411.
 1420 China, China Radio Intl: Current Affairs. See M 1420.
 1434 China, China Radio Intl: Press Clippings. See M 1425.
 1439 China, China Radio Intl: Orient Arena. Focus on sporting events and Chinese sports personalities.
 1445 China, China Radio Intl: Voices from Other Lands. See S 1445.

Wednesdays

- 1400 Australia, Radio: RA News. See S 0000.
 1400 China, China Radio Intl: News. See S 1400.
 1400 USA, WEWN Birmingham AL: The Journey Home (encore). A call-in show that examines why so many people are being drawn home to the Catholic Church.
 1405 Australia, Radio: The Planet (Part 2). See M 1315.
 1411 China, China Radio Intl: News about China. See S 1411.
 1420 China, China Radio Intl: Current Affairs. See M 1420.
 1434 China, China Radio Intl: Press Clippings. See M 1425.
 1438 China, China Radio Intl: Profile. The activities of an interesting individual are examined.
 1445 China, China Radio Intl: Learn to Speak Chinese. Chinese language lessons for English speakers.

Thursdays

- 1400 Australia, Radio: RA News. See S 0000.
 1400 China, China Radio Intl: News. See S 1400.
 1400 USA, WEWN Birmingham AL: Pillars of Faith (encore). See T 0000.
 1405 Australia, Radio: The Planet (Part 2). See M 1315.
 1411 China, China Radio Intl: News about China. See S 1411.
 1415 China, China Radio Intl: News Analysis. Background on

- current news events.
 1420 China, China Radio Intl: Current Affairs. See M 1420.
 1434 China, China Radio Intl: Press Clippings. See M 1425.
 1438 China, China Radio Intl: Focus. Looking at an issue of significance to China's development.
 1444 China, China Radio Intl: Cultural Spectrum. The rich cultural heritage of China in literature, music and art.

Fridays

- 1400 Australia, Radio: Radio National News. News from the Australian Broadcasting Network (ABC).
 1400 China, China Radio Intl: News. See S 1400.
 1400 USA, WEWN Birmingham AL: LiveWire (encore). Repeat of live call-in program.
 1405 Australia, Radio: The Planet (Part 2). See M 1315.
 1411 China, China Radio Intl: News about China. See S 1411.
 1420 China, China Radio Intl: Current Affairs. See M 1420.
 1433 China, China Radio Intl: Press Clippings. See M 1425.
 1437 China, China Radio Intl: Life in China. Focus on an aspect of everyday living.
 1444 China, China Radio Intl: Global Review. News about developing nations.

Saturdays

- 1400 Australia, Radio: Radio National News. See F 1400.
 1400 China, China Radio Intl: News. See S 1400.
 1400 USA, WEWN Birmingham AL: Our Father's Plan. See W 0100.
 1411 China, China Radio Intl: News about China. See S 1411.
 1420 China, China Radio Intl: Chinese Folktales. The traditions, moral values, etiquette and customs of this ancient country and stories about real and legendary figures of China.
 1425 China, China Radio Intl: The Cooking Show. Chinese recipes and cooking tips direct from Beijing.
 1430 China, China Radio Intl: Chinese Scrapbook. Snippets of facts about China's past and present.
 1435 China, China Radio Intl: Music from China. Chinese music from traditional to pop to annual music festivals.

FREQUENCIES

1600-1700	Algeria, R Algiers Intl	11715af	15160me	1600-1606	UK, BBC Asian Service	3915as	5975as	5990as	6195as
1600-1700	Anguilla, Caribbean Beacon	11775am				7160as	9740as	11750as	15310as
1600-1700	Australia, Radio	5995pa	6020pa	6080as	9500as	9410eu	9515na	12095eu	15485eu
		9580pa	9660pa	11660as		15575eu	17840am		
1600-1700 vl	Australia, VL8A Alice Spg	2310do				13815am			
1600-1700 vl	Australia, VL8K Katherine	2485do				15590am			
1600-1700 vl	Australia, VL8T Tent Crk	2325do				9930as			
1600-1700 vl	Canada, CBC N Quebec Svc	9625do				6035af	6110as	6160as	7125as
1600-1700	Canada, CFRX Toronto	6070do				7215as	9645as	9700me	9760as
1600-1700	Canada, CFVP Calgary	6030do				13600af	13710af	15205va	15225af
1600-1700	Canada, CHNX Halifax	6130do				15255va	15395as	15410af	15445af
1600-1700	Canada, CKZN St John's	6160do				17895af			
1600-1700	Canada, CKZU Vancouver	6160do				11875na	13615na	15745eu	
1600-1700	China, China Radio Intl	9565af	9620af			9400am			
1600-1700 as	Costa Rica, Adv World R	9725na				13760am	15105am		
1600-1627	Czech Rep, Radio Prague	5930eu	17485af			7490na	13595na		
1600-1700	Ethiopia, Radio	7165af				9465am			
1600-1700	France, Radio France Intl	11615af	11705af	12015af	15210af	15420am			
		15640af	17850af			18930af			
1600-1650	Germany, Deutsche Welle	6170as	7130af	7225as	9735af	9475am	12160am	13845am	15685am
		9875as	11810af	15145as	21695af	11705na	11830na	15695va	17555va
		5850va				17750na	21525va		
1600-1700	Germany, Sunrise Radio	6130eu	13810me	15625na		13765va	15500va		
1600-1700	Guam, AWR/KSDA	9355as				9840eu	12010eu	15010eu	
1600-1630	Guam, TWR/KTWR	15330as				3330af	4965af		
1600-1630	Iran, VOIRI	7215as	9780as	13605me		6165do	6265do		
1600-1700	Ireland, Unt Christian BC	6200do				4828do	5012do		
1600-1700 as/vl	Italy, IRRS	3985va				3915as	5975as	7160as	9740as
1600-1630	Jordan, Radio	11690eu				11750as			
1600-1700	Kenya, Kenya Broadc Corp	4935do				5990as	6195as	15310as	
1600-1700	Lebanon, Voice of Hope	9960me				11860af			
1600-1700	Malaysia, Radio	7295do				15420af			
1600-1700 vl	Namibia, NBC	4930af	4965af			3915as	5975as	7160as	9510as
1600-1650 occasnl	New Zealand, R NZ Intl	6100pa				9740as	11750as		
1600-1700	Nigeria, Voice of	7255af	15120af			9515na			
1600-1630 s	Norway, Radio Norway Intl	13800va	15340na	18950va		4005eu	5883eu	7250eu	9645eu
1600-1630	Pakistan, Radio	9650as	11570me	15170af	17720af	11810eu			
1600-1700 vl	Papua New Guinea, NBC	4890do				6155eu	11855me	13710as	13730va
1600-1700	Russia, Voice of Russia WS	9675me	11775me	11850me	12065me	5910eu	7290eu		
		15540me				6140as	7150as		
1600-1625	S Africa, Channel Africa	6000af				15255af			
1600-1700	South Korea, R Korea Intl	5975as	9515va	9870as		6285eu	12125eu		
1600-1700 as	Sri Lanka, Sri Lanka BC	9730as	15425as			12015af			
1600-1700	Swaziland, Trans World R	9500af				5920eu	6055eu	7345eu	
1600-1615	Switzerland, Swiss R Intl	9575as	15265as			3306do	4828do		
1600-1700 vl	Tanzania, Radio	5050do				11860af	15420af		
1600-1645	UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu	15186af			
1600-1700	UK, BBC African Service	3255af	6190af	15400af	17705af	6145pa			
		17830af	21470af	21660af					

SELECTED PROGRAMS

Sundays

- 1600 Australia, Radio: RA News. See S 0000.
 1600 Norway, Radio Norway Intl: Norway Now. See S 0600.
 1600 USA, WEWN Birmingham AL: Spanish Mass (live). Catholic Mass in Spanish.
 1600 VOA (Special English): VOA News. See S 1500.
 1605 Australia, Radio: The National Interest. Terry Lane takes an incisive look at the week's major events.
 1606 VOA (Special English): All About English. See S 1506.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.
 1640 VOA (Special English): Words and their Stories (Special English). See S 0040.
 1645 VOA (Special English): People in America (Special English). See S 0045.

Mondays

- 1600 Australia, Radio: RA News. See S 0000.
 1600 USA, WEWN Birmingham AL: Daily Mass (encore). From Our Lady of the Angels Monastery in Birmingham, Alabama.
 1600 VOA (Special English): VOA News. See S 1500.
 1605 Australia, Radio: Music Deli. See M 0610.
 1606 VOA (Special English): All About English. See S 1506.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.
 1640 VOA (Special English): Development Report (Special English). See M 0040.
 1645 VOA (Special English): This is America (Special English). See M 0045.

Tuesdays

- 1600 Australia, Radio: RA News. See S 0000.
 1600 USA, WEWN Birmingham AL: Daily Mass (encore). See M 1600.
 1600 VOA (Special English): VOA News. See S 1500.

- 1605 Australia, Radio: Music Deli. See M 0610.
 1606 VOA (Special English): All About English. See S 1506.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.
 1640 VOA (Special English): Agriculture Report (Special English). See T 0040.
 1645 VOA (Special English): Science in the News (Special English). See T 0045.

Wednesdays

- 1600 Australia, Radio: RA News. See S 0000.
 1600 USA, WEWN Birmingham AL: Daily Mass (encore). See M 1600.
 1600 VOA (Special English): VOA News. See S 1500.
 1605 Australia, Radio: Women Out Loud! A weekly radio program documenting, exploring and challenging the conditions of women's lives.
 1606 VOA (Special English): All About English. See S 1506.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.
 1640 VOA (Special English): Science Report (Special English). See W 0040.
 1645 VOA (Special English): Exploration (Special English). See W 0045.

Thursdays

- 1600 Australia, Radio: RA News. See S 0000.
 1600 USA, WEWN Birmingham AL: Daily Mass (encore). See M 1600.
 1600 VOA (Special English): VOA News. See S 1500.
 1605 Australia, Radio: Hindsight. Michelle Rayner presents current events from an historical perspective.
 1606 VOA (Special English): All About English. See S 1506.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.

- 1640 VOA (Special English): Science Report (Special English). See W 0040.
 1645 VOA (Special English): The Making of a Nation (Special English). See H 0045.

Fridays

- 1600 Australia, Radio: Radio National News. See F 1400.
 1600 USA, WEWN Birmingham AL: Daily Mass (encore). See M 1600.
 1600 VOA (Special English): VOA News. See S 1500.
 1605 Australia, Radio: Away. See M 0110.
 1606 VOA (Special English): All About English. See S 1506.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.
 1640 VOA (Special English): Environment Report (Special English). See F 0040.
 1645 VOA (Special English): American Mosaic (Special English). See F 0045.

Saturdays

- 1600 Australia, Radio: Radio National News. See F 1400.
 1600 USA, WEWN Birmingham AL: Daily Mass (encore). See M 1600.
 1600 VOA (Special English): VOA News. See S 1500.
 1605 Australia, Radio: Melisma (Part 2). Musical revelations (2nd hour).
 1606 VOA (Special English): All About English. See S 1506.
 1630 Egypt, Radio Cairo: Egyptian Music.
 1630 UAE, Radio Dubai: News.
 1630 VOA (Special English): News (Special English). See S 0030.
 1640 VOA (Special English): In the News (Special English). See A 0040.
 1645 VOA (Special English): American Stories (Special English). See A 0045.

FREQUENCIES

2300-0000	Anguilla, Caribbean Beacon	6090am			2300-0000	UK, BBC Asian Service	3915as	5965as	6035as	6195as
2300-0000	Australia, Radio	9660pa	12080as	17715pa	17795pa		7110as	11945as	11955as	17790as
		21740pa				2300-0000	UK, BBC World Service	5975am	6175na	9590na
2300-0000 vl	Australia, VL8K Katherine	5025do					12095sa			
2300-0000 vl	Australia, VL8T Tent Crk	4910do				2300-0000 w	UK, Merlin Network One	9645eu	9780na	11985na
2300-0000	Bulgaria, Radio	9485na	11720na			2300-0000	USA, KAIJ Dallas TX	13815am		13690na
2300-0000	Canada, CBC N Quebec Svc	9625do				2300-0000	USA, KTNB Salt Lk City UT	15590am		
2300-0000	Canada, CFRX Toronto	6070do				2300-0000	USA, Voice of America	7215as	9705as	9770as
2300-0000	Canada, CFVP Calgary	6030do					15185as	15290as	15305as	17735as
2300-0000	Canada, CHNX Halifax	6130do					17820as			
2300-0000	Canada, CKZN St John's	6160do				2300-0000	USA, WEWN Birmingham AL	5825na	9975eu	13615na
2300-0000	Canada, CKZU Vancouver	6160do				2300-0000 mtwhfam	USA, WGTG McCaysville GA	5085am		
2300-2329	Canada, R Canada Intl	5960am	9755am	11895am	13670am	2300-0000	USA, WHRA Greenbush ME	15460af		
		15305am				2300-0000	USA, WHRI Noblesville IN	13760am		
2300-0000	Costa Rica, RF Peace Intl	15050am	21460am			2300-0000	USA, WINB Red Lion PA	13790am		
2300-2330	Cuba, Radio Havana	9550am				2300-0000	USA, WJCR Upton KY	7490na	13595na	
2300-0000	Egypt, Radio Cairo	9900am				2300-0000 s	USA, WRMI/R Miami Intl	9955ca		
2300-2350	Germany, Deutsche Welle	5975as	6090as	7235as	9690as	2300-0000 s	USA, WRNO New Orleans LA	7355am		
2300-0000	Germany, Overcomer Minist	3975eu	9510as	11625sa	12050sa	2300-0000 sm	USA, WSHB Cypress Crk SC	13770af	15285sa	
2300-2330 as	Guam, AWR/KSDA	11775as				2300-0000 irreg	USA, WWBS Macon GA	11910na		
2300-0000 mtwhf	Guam, AWR/KSDA	11775as				2300-0000	USA, WWCR Nashville TN	5070am	7435am	9475am
2300-0000	India, All India Radio	7410as	9705as	9950as	11620as	2300-0000	USA, WYFR Okeechobee FL	11855na		
2300-0000	Ireland, Unt Christian BC	6200do				2300-2315	Vatican State, Vatican R	7305au	9600au	11830au
2300-2315	Liberia, LCN/R Liberia Int	5100do				2310-2315	Kyrgyzstan, Kyrgyz Radio	4010do	4050do	
2300-0000	Malaysia, Radio	7295do				2329-2359 as	Canada, R Canada Intl	11895am	15305am	
2300-0000 vl	Namibia, NBC	3270af	3289af			2329-2359	Canada, R Canada Intl	5960am	9755am	13670am
2300-0000	New Zealand, R NZ Intl	17675pa				2330-0000 vl	Ghana, Ghana Broadc Corp	4915af		
2300-2315	Nigeria, FRCN/Radio	3326do	4770do	4990do		2330-0000	Netherlands, Radio	6020na	6165na	9845na
2300-2357	North Korea, R Pyongyang	11335na	11700na	13760na	15130na	2330-0000	Vietnam, Voice of	9840eu	12020eu	15010eu
2300-2330 s	Norway, Radio Norway Intl	9935as	11640as	11735sa	13805am	2335-2345	Greece, Voice of	9395sa	9425sa	11595sa
2300-0000 vl	Papua New Guinea, NBC	9675do				2335-2345	Sierra Leone, SLBS	3316do		11645sa
2300-0000	Romania, R Romania Intl	6130eu	7195eu	9570na	11830na	2345-0000 mtwhf	UK, BBC Asian Service	3915as		
2300-0000	Singapore, RCorp Singapore	6150do								

SELECTED PROGRAMS

Sundays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 Egypt, Radio Cairo: Egyptian Music.
 2300 Norway, Radio Norway Intl: Norway Now. See S 0600.
 2300 USA, WEWN Birmingham AL: Sunday Mass (encore) (from 2300). See S 1200.
 2305 Egypt, Radio Cairo: The Holy Koran and Its Meaning.
 2310 Australia, Radio: Asia Pacific. News and analysis from across the Pacific and Asia with Di Martin.
 2315 Egypt, Radio Cairo: News.
 2330 Australia, Radio: Media Report. See S 0530.
 2330 Egypt, Radio Cairo: Egyptian Songs.
 2330 USA, WEWN Birmingham AL: The Beatitudes. See S 0600.
 2335 Egypt, Radio Cairo: Interview.
 2345 Egypt, Radio Cairo: Business Radio.

Mondays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 USA, WEWN Birmingham AL: Catholic History in the U.S. Father Charles Conner surveys the growth and development of the Catholic Church in the United States.
 2310 Australia, Radio: Asia Pacific. See S 2310.
 2315 Egypt, Radio Cairo: News.
 2328 USA, WEWN Birmingham AL: Pro-Life Issues. Dr. John Wilke, president of the International Right to Life, presents his views.
 2330 Australia, Radio: The Sports Factor. Amanda Smith hosts the program that debates Australia's sporting culture.
 2330 Egypt, Radio Cairo: Arabic Music.
 2330 USA, WEWN Birmingham AL: Franciscan University Connection. Father Michael Scanlon and guests speak from Steubenville, Ohio.
 2350 USA, WEWN Birmingham AL: Precious Blood Litany. Divine Worship.

Tuesdays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 USA, WEWN Birmingham AL: Crisis in Culture. Father George Rutler examines a current issue.
 2305 Egypt, Radio Cairo: E-Mail.
 2310 Australia, Radio: Asia Pacific. See S 2310.
 2315 Egypt, Radio Cairo: News.
 2328 USA, WEWN Birmingham AL: Pro-Life Issues. See M 2328.
 2330 Australia, Radio: The Health Report. See M 1530.
 2330 USA, WEWN Birmingham AL: Franciscan University Connection. See M 2330.
 2350 USA, WEWN Birmingham AL: Precious Blood Litany. Divine Worship.

Wednesdays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 Egypt, Radio Cairo: Program Preview.
 2300 Merlin Network One: News.
 2300 USA, WEWN Birmingham AL: St. Francis - Mirror of Christ. Father Andrew Apostoli discusses St. Francis and his teachings.
 2303 Merlin Network One: Rock Radio Network.
 2310 Australia, Radio: Asia Pacific. See S 2310.
 2315 Egypt, Radio Cairo: News.
 2328 USA, WEWN Birmingham AL: Pro-Life Issues. See M 2328.
 2330 Australia, Radio: The Law Report. See T 1530.
 2330 Egypt, Radio Cairo: Arabic Music.
 2330 USA, WEWN Birmingham AL: Franciscan University Connection. See M 2330.
 2350 USA, WEWN Birmingham AL: Precious Blood Litany. Divine Worship.

Thursdays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 USA, WEWN Birmingham AL: Our Lady in Scripture and Tradition. This series draws from the rich teachings found in scripture and tradition about Mary and her many apparitions (Fr. Andrew Apostoli).
 2310 Australia, Radio: Asia Pacific. See S 2310.
 2315 Egypt, Radio Cairo: News.
 2328 USA, WEWN Birmingham AL: Pro-Life Issues. See M 2328.
 2330 Australia, Radio: The Religion Report. See S 0230.
 2330 Egypt, Radio Cairo: Arabic Music.
 2330 USA, WEWN Birmingham AL: Franciscan University Connection. See M 2330.
 2350 USA, WEWN Birmingham AL: Precious Blood Litany. Divine Worship.

Fridays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 USA, WEWN Birmingham AL: Moments of Truth. Divine Worship.
 2305 Australia, Radio: Book Reading. Serialized readings of the best Australian novels.
 2305 Egypt, Radio Cairo: The Holy Koran and Its Meaning.
 2315 Egypt, Radio Cairo: News.
 2328 USA, WEWN Birmingham AL: Pro-Life Issues. See M 2328.
 2330 Australia, Radio: Week's End. See S 0430.
 2330 Egypt, Radio Cairo: Arabic Music.
 2330 USA, WEWN Birmingham AL: Franciscan University Connection. See M 2330.
 2350 USA, WEWN Birmingham AL: Precious Blood Litany. Divine Worship.

Saturdays

- 2300 Australia, Radio: RA News. See S 0000.
 2300 USA, WEWN Birmingham AL: Feminism and Femininity. Dr. Alice Von Hildebrand and her guests discuss how the philosophy of some feminists have denigrated women's feminine nature.
 2310 Australia, Radio: Australia All Over. Join listeners across the island continent as Ian McNamara throws the spotlight on life in Australia.
 2315 Egypt, Radio Cairo: News.
 2328 Egypt, Radio Cairo: Press Review.
 2330 USA, WEWN Birmingham AL: Off the Shelf. See T 0630.
 2335 Egypt, Radio Cairo: The Civilization of Islam.
 2344 Egypt, Radio Cairo: Faces.
 2356 Egypt, Radio Cairo: Egyptian Songs.

MT MONITORING TEAM

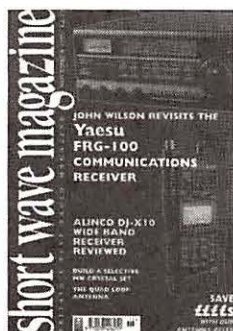
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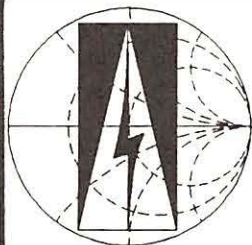
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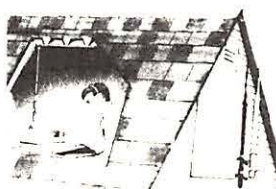
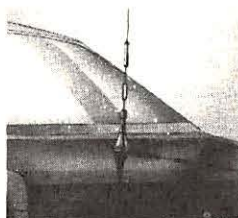


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Make this page work for you

We are now starting a new DX season! After nearly two years of using the present tabular format on this propagation conditions page, I believe it's time to refresh the memory on how to use the table.

The table covers three areas of the continental US, and the same circuits are calculated for each area. The forecasts are calculated for mid-month to mid-month — an unusual span of dates that was prompted by the observation that magazines, including *MT*, are sometimes delayed in the mail.

What is displayed in the table is the OWF (Optimum Working Frequency) for a particular circuit. This frequency should give you the best chance, 90 percent of the time, to hear a station located at the other end of the circuit.

If you feel adventurous, look up in the higher frequency area for possible signals. The tabulated OWF is equivalent to 80 percent of the MUF (Maximum Usable Frequency), so theoretically you could search as high as the MUF and hope to hear a signal. For example, if the tabulated OWF is 8.0 MHz, the MUF would be approximately 10 MHz, so you could go lurking in the upper 2 MHz. When you reach the MUF your chances of hearing a good signal have now decreased to about 10 percent of the time, but it is not impossible to hear something.

As it is relatively safe to assume reciprocity in the forecasts, the circuits are labeled "TO/FROM." We know that the *MT* forecasts have been used with success by overseas listeners to listen to North America broadcasts. A few months ago, I received an e-mail from a listener in Switzerland who uses the "Western Europe" circuit to choose his best frequency to listen to shortwave stations on the East Coast and mid-western USA. Amateur radio operators have also used, with success, the values in the table for two-way communications around the world.

If you see a "P" after the name of an area, that means that the signal on that particular circuit can be influenced by auroral zone flutter, distortion or other phenomena while traveling over the pole.

The OWF can be zero at certain times. The number "0" is replaced by a starred cell in our table presentation. When you see this, don't give up; keep on looking in the area of the last

OPTIMUM WORKING FREQUENCIES (MHz) For the Period 15 September to 14 October 1998 Flux=146 SSN=108 Predictions prepared using ASAPS for Windows®

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TO/FROM US WEST COAST																								
SOUTH AMERICA	25	24	21	17	15	15	14	14	14	13	11	12	12	15	22	26	26	27	28	28	28	28	28	27
WESTERN EUROPE	11	10	10	10	10	9	9	10	9	9					14	17	19	19	19	18	16	15	13	12
EASTERN EUROPE (P)		10	9	10	11	12	11								13	16	18	17	16	14				
MEDITERRANEAN	16	15	15	15	14	13	12	11							16	19	21	21	21	21	19	18	16	16
MIDDLE EAST (P)	12	12	13	17	15	13									10	12	16	16	14	13				12
CENTRAL AFRICA	22	21	20	17	15	13	12	12							18	22	24	24	24	24	24	25	25	24
SOUTH AFRICA	19	17	16	14	13	14	13	13							16	22	26	27	27	27	26	25	23	21
SOUTH EAST ASIA (P)	23	23	22	20	18	15					10	10	10	10	11	13	17	20	21	19	17	14	14	20
FAR EAST	23	23	22	20	18	15	13	11	10	10	10	10	10	10	10	12	12	12	12	12	15	21	23	23
AUSTRALIA	29	29	28	26	22	19	17	16	15	15	14	13	12	12	12	15	16	15	14	16	21	26	28	29
TO/FROM US MIDWEST																								
SOUTH AMERICA	22	20	17	15	14	13	13	13	13	11	10	11	13	19	24	25	25	25	26	26	26	26	25	24
WESTERN EUROPE	13	12	12	11	11	11	11	11	11	11	11		13	17	20	21	21	22	21	21	19	17	15	14
EASTERN EUROPE	9	9	9	9	10	11	11							14	17	19	19	18	16	14	12			
MEDITERRANEAN	16	15	15	15	13	12	12	11						17	21	22	22	22	22	21	19	18	17	16
MIDDLE EAST (P)	13	12	13	15	13	12								14	17	19	19	18	16	14	14	13	13	13
CENTRAL AFRICA	23	20	17	15	14	13	13	12						15	20	24	25	25	25	24	25	25	25	24
SOUTH AFRICA	19	17	16	15	13	14	13	13	13					16	23	27	27	27	28	28	26	25	23	22
SOUTH EAST ASIA (P)	22	21	19	17									10	10	11	14	17	19	20	19	18	16	14	13
FAR EAST	23	22	20	18	15	13	12	11	10	10	10	10	10	11	13	13	13	13	12	13	16	21	22	23
AUSTRALIA	28	28	25	20	17	15	14	14	14	13	13	13	12	12	16	17	16	15	14	16	22	26	28	28
TO/FROM US EAST COAST																								
SOUTH AMERICA	18	15	14	13	13	12	12	11	11	10	9	12	19	22	23	23	24	23	23	24	23	23	23	21
WESTERN EUROPE	11	11	10	10	10	10	9	10	11	10	11	15	19	20	20	20	20	20	20	19	17	16	14	12
EASTERN EUROPE	10	10	9	9	10	11	10	10				13	17	19	20	20	19	18	16	14	13	11	10	10
MEDITERRANEAN	16	15	15	14	13	12	12	12	11			16	21	22	23	23	23	23	23	21	18	17	16	16
MIDDLE EAST (P)	13	13	13	13	12	12						15	19	20	22	22	21	19	17	15	14	14	13	13
CENTRAL AFRICA	19	18	17	16	16	14	14	14	13			15	22	26	27	27	28	28	28	27	25	26	26	25
SOUTH AFRICA	19	17	16	15	13	15	14	14				21	26	27	27	28	28	28	28	26	25	24	22	20
SOUTH EAST ASIA (P)	18	16	15									11	14	17	19	20	20	19	18	17	16	14	13	16
FAR EAST	21	19	16	15	13	12	11	11	11	11	11	11	12	13	13	13	13				15	19	22	22
AUSTRALIA	26	22	18	15	14	13	13	13	13	13	12	12	13	18	18	17	15	14		16	22	26	28	27

***Unfavorable conditions: Search around the last listed frequency for activity.**

frequency listed for that circuit. You never know what is lurking out there! The reason why the OWF is 0 is simply that the absorption frequency on this circuit at that particular time is higher than the OWF, and in theory communication at the OWF should be impossible. But I have been in the radio field long enough to know that sometimes the theory is not completely correct, so do not despair!

What do some of the various areas encompass? "Mediterranean" covers an area bounded in the North by Malta, in the East by Lebanon,

in the South by all of North Africa and in the West by Gibraltar. "Middle East" is area bounded by the Caspian Sea to the North; Saudi Arabia in the West, Yemen in the South and by Eastern Iran in the East. "South East Asia" is an area that covers a wide area bounded by Sri Lanka, Central China, Vietnam and Singapore. The "Far East" region comprises the broadcasters in the Western Pacific, Japan and the Philippines.

The sunspots are really climbing and the coming winter should be a good DX season.

Planning for the Shortwave Season

Well, here we are, getting ready to begin another season in the wonderful world of shortwave listening. Those just starting out in this hobby are going to reap the benefits of a vastly improved sunspot cycle, making conditions for long distance listening better than they have been in recent memory. In fact, you can pretty much spin your dial across the 49 meter band or a couple of other places on the bands on any evening and hear enough new stuff to keep you more than busy.

But, sooner or later, you're going to be where most folks are — somewhere between the first twenty-five and fifty countries logged — and you're likely to say to yourself, "Ya know, I just gotta get myself organized!"

After you have been listening around a bit, you may detect a trend in your listening style. You may be well on the way to becoming a hard core DXer, scrounging around for weak signals in languages that you can barely identify, much less translate. Or you may be one of those people who finds a great deal of pleasure in learning about the world from the program content of English language broadcasts from foreign lands. Then again, you could be the kind of person who finds their fun in tracking down point-to-point utility stations.

■ Plan for success

DXer, SWL, or Ute Hunter, lack of a sound plan will lead you to monitoring frustration. Just like in the real world, a little planning and setting a few goals can go a long way in making life a happy place.

For the purposes of this article, let's concentrate on trying to log new countries. This is a common goal among beginning shortwave hobbyists, but you can easily adopt these ideas to logging whatever target you choose to shoot for. Many beginners set rather lofty goals such as "I am going to log 100 countries in a season." Can it be done? Sure. Can it be done without some sort of plan? Possibly, but I wouldn't want to try it.

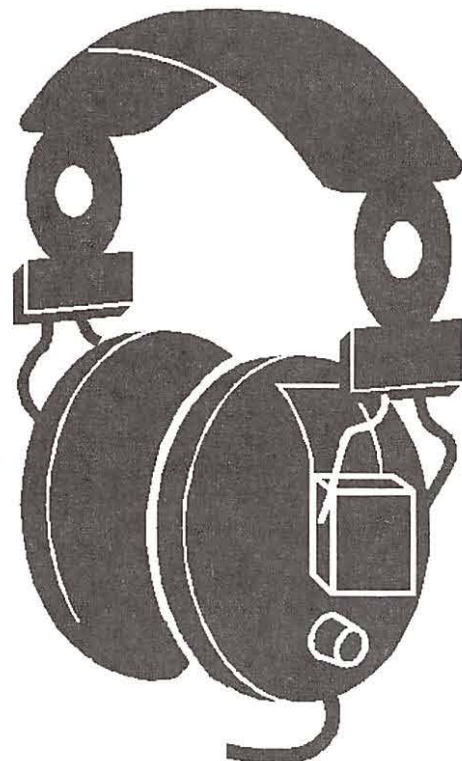
Before you even establish a goal, take a good, hard look at your listening habits. There are probably a few folks out there who are able to come home from work, grab a quick bite to eat (right at the receiver controls, of course) and spend their entire night chasing signals across the shortwave bands. Well good for them! Most of us live in a world where we want to spend a reasonable amount of time with our families, not to mention cut the grass, write out the bills, do the laundry and at least a dozen other necessary life activities that take away time from filling our log books with stations.

But that doesn't mean you can't get some real listening done. After life's various responsibilities are all taken care of, you may be able to find an hour, possibly two, on any weeknight to fit in some serious listening. If you get all your "honey do's" done, come the weekend you might even be able to tack an extra hour or so on to your evening listening times.

Now let's go over these figures a bit more closely. Given two hours for an evening's listening session and allowing an average time for each logging of about an hour (figure twenty or so minutes for tuning around to find that new one and a good forty or so minutes listening to gather enough information to write a really good confirmation request letter), then, on a good night when everything cooperates, the best you are likely to achieve is two new log entries.

Considering life's various responsibilities and even a bit of devotion to other hobbies, you can count on maybe getting three 2-hour nights at the dials in any given week. So you're looking at adding around five or six stations to your log book in a good week. We have about 30 weeks from September until the serious static crashes of spring and summer begin to get in the way of your listening enjoyment. So that's two stations per night, three nights per week for thirty weeks. ($2 \times 3 \times 30 = 180$ loggings!)

If you can put in that level of commitment to monitoring you will be looked upon with awe by most if not all your radio



monitoring companions. Even if you can just log *one* new signal in an evening under this game plan ($1 \times 3 \times 30 = 90$), you could very well be on your way to getting that first hundred countries in one season. All you would need is ten "bonus" nights when you pick up an extra station. So...Is it possible to grab 100 countries in a season?...Yep. Is it likely that you'll do it?...Nope.

The real world, the vagaries of propagation conditions and good old Murphy's Law all will chip away at that ultimate 180 number. So don't get too excited if your numbers are significantly lower. Relax, you have the rest of your life to do this hobby. Even the hottest folks in the hobby with the best equipment and antennas that stretch across a couple of counties run into the very same roadblocks to running up their totals.

■ Improve your chances of success

You can do a few things by way of planning that can allow you to maximize your chances at getting all the stations you can during this listening season.

● Take a hint from your compatriots in the amateur radio world. Build yourself a "hit" list of needed countries. If you have set yourself the entirely reasonable goal of grabbing 25 - 50 new countries during this coming listening season, you need to have a good understanding of the "playing field." You need to go to a solid signal resource. In the world of logging shortwave broadcast stations, the best tools remain *Passport to Worldband Radio* and *The World Radio TV Handbook*. Both books are available from several of the advertisers found in *MT*.

Each resource has a lot to say for it. If you're trying to figure out who is on when and on what frequency for the purpose of building a good hit list, for the beginner I would lean more toward *Passport to Worldband Radio*. If you are someone who has their first fifty or so countries under their belts, you may find the additional information on transmitter power levels and antenna orientation found in the *WRTH* will help you pick out the harder ones. Either book is going to give you good information on where to send for that confirmation card or letter.

Some people can't manage the expense of buying both of these books new every year (they are published annually). My suggestion would be, buy one in even years and the other in odd years. Also, don't forget *MT*'s own Shortwave Guide column. It will give you a good shot at a number of countries on your hit list since it has the added advantage of being updated 12 times a year.

● Now give a bit of thought as to how you will set up the information in your hit list. Setting up the data by country may not be the most useful way to do business. A better way to make your list, given how most people do their listening, would be based upon the **time** the stations are on the air. If Radio Freedomia is only on at 2 a.m. your local time but you really need it for your log, you will have to decide whether to set your alarm clock to try to grab it.

The next most important list information is probably available **frequency**. If you look at the Shortwave Guide and Propagation columns in *MT*, you will quickly get a notion of which bands of frequencies are likely to be heard in your location at a given time of day or night. There's not much point in getting up in the middle of the night to hear Radio Freedomia if it's only going to be

on a frequency that doesn't propagate to you.

...That said, there is a notable exception to this rule. Propagation is only barely a science. Strange things happen which allow things to be heard that have no business making it to your antenna. If you've logged all you can normally expect to hear at a given time, there's no law that says you can't tune your radio over to some of those unlikely frequencies on the off chance that "something weird" might happen. I have to say that there are about a dozen cards in my QSL collection that came from signals that had no business being heard when I heard them.

● As you go through the season, checking off those countries on your hit list, you are bound to run into a few "bad" nights. There will be nights when conditions just don't hold up. Times when you just can't get to the dials at the same time that your hit list stations are going to show up. What are you going to do?

Why, you're going to have fun anyway. Just tune into a strong signal such as the BBC, sit back and listen to the programming for the evening. In the rush to grab every country that can be had by human effort, you may forget that there are other reasons to listen to the radio.

Let's change that math model around. You can easily spend twenty years in this hobby. That means you would only have to log five new stations per year to get your

hundred countries during your career ($5 \times 20 = 100$). What's your rush? Relax and have fun. That's what this hobby is all about.

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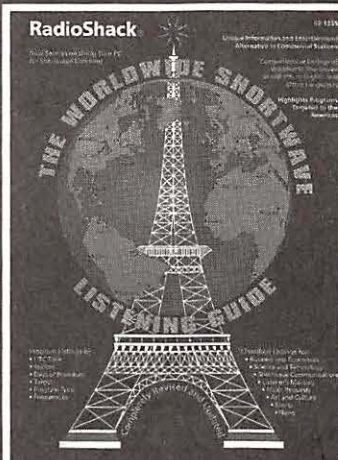
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Q. As a former New York resident, are there any shortwave broadcasts originating from my home state that I can hear in Canada? (Ronald Cohen, Toronto, Ont.)

A. Not that we are aware of. Years ago there were some, but all U.S. shortwave stations must direct their broadcasts outside of the U.S. since that medium is not recognized in our country as a domestic service. U.S. stations often defeat this policy by locating in southern states, then beaming to Canada, covering much of the U.S. in the process—accidentally, of course!

Q. I recently purchased the latest M Street Radio Directory which is bigger and easier to read, but I am puzzled by the abbreviations next to the listings, like cp, DA-1, 3c6c, and so on. What does this mean? (Robert Brock, Phoenix, AZ)

A. It means that you haven't consulted the user's guide on pages 9-15. "cp" means that a construction permit has been authorized; DA-1 indicates that the station's direction pattern is the same day and night; "3c 6c" shows that the stations has changed its call letters both in 1993 and 1996.

Q. Maritime VHF channels are number 1-28 and 60-88; where are the channels missing from this list? (Norm Budd)

A. There never were any. The original channels 1-28 were spaced 50 kHz apart; the more recent channels 60-88 were sandwiched between the old channels, making the present spacing 25 kHz.

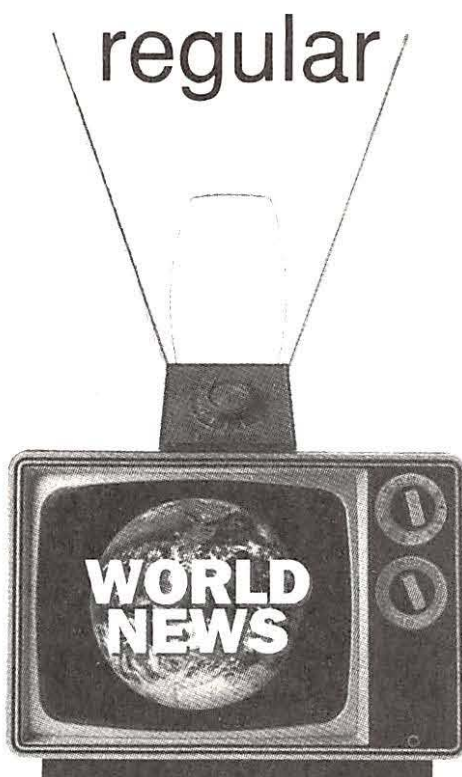
Q. I am planning to move from sunny California to the Canadian border of New York State. Do I

need to take extra winter precautions for my antennas, coax, guy wires, and rotator? Should I move at all? (Mike Elcsisin, Lake Berryessa, CA)

A. The technical questions are easy, but the last one got me. While my whimsical nature moves me to advise you not to move at all, I think more than a few New York State subscribers would take me to task! It gets very cold up there, with mountainous snow accumulations; I had a taste of it growing up in Cleveland.

Vertical antennas are not a problem for snow and ice accumulation, nor are most angled guy wires and vertical coax and rotator control cable runs. Horizontal wire antennas and guy wires should be heavy gauge, stranded, with a pulley-and-weight mechanism at one end recommended to allow the installation to sag under snow and ice loading without breaking.

Coaxial cable is capable of withstanding very low—as well as high—temperatures, but be sure it is well insulated at the connectors to prevent moisture intrusion. Ice can, indeed,



lock up the rotator, although well-designed units utilizing low-temperature grease minimize this, and the control cable won't be affected by the cold.

The bottom line is that the weather will have minimum impact on your radio hobby, and the reception of European shortwave broadcasters will be improved substantially. Good thing, too, because you will be inside a lot!

Q. Does lightning travel from cloud to ground, or vice versa? And what is heat lightning? (Mark Burns, Terra Haute, IN)

A. Roughly 80% of all lightning strokes are cloud-to-cloud; the remaining 20% are approximately evenly divided between cloud-to-ground and ground-to-cloud, depending upon the nature of the updrafts and the terrain.

All lightning generates thunder, but the farther away it is, the fainter it will be heard. When it is too distant to be heard, that's heat lightning, so named because of its common occurrence on hot summer evenings.

You can estimate the distance of a lightning stroke by counting the seconds until you hear the thunder, approximately five seconds per mile.

Bob's Tip of the Month

Quieting the Click on the Grove SP-200 Sound Enhancer



The Grove SP-200 Sound Enhancer is a very popular active speaker accessory for shortwave, scanner, ham radio, countermeasures, and many other applications. With its adjustable notch, peak, bandwidth, noise limiting, bass and treble control, and tape recorder activation, as well as a powerful internal amplified speaker, the all-analog design improves listening on virtually every receiving instrument.

But it does draw one occasional user complaint: a noisy relay which audibly clicks as it opens after a few seconds if there is no audio being received. While most users grow used to the small distraction, some listeners

find it annoying. Fortunately, there is an easy remedy which requires no modification whatsoever.

The instructions call for the receiver's volume to be set so that the green "Audio Level" light blinks on the SP-200; this is to assure that the tape-activator relay will respond properly. But if you aren't using the tape activator function, simply lower the companion receiver's volume slightly so that the green light doesn't blink, and turn up the SP200 volume control to compensate. All other functions will continue to work normally, and the relay won't click. It's that simple!

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New LF Book; More on the *Titanic*

Ever since the untimely passing of Ken Cornell, W2IMB, I've had many inquiries regarding the availability of his famous book, *The Low and Medium Frequency Radio Scrapbook*. I've spoken with a close friend of Ken's family who plans to republish the book in the future, but to date it remains unavailable.

It should come as welcome news then, that the Radio Society of Great Britain (RSGB) has recently published the 2nd Edition of the *LF Experimenter's Source Book*. The new book is 50% bigger than the first and contains many articles never before published. Although it focuses mainly on the 136 kHz European experimenter's band, almost all of the information in the book can be applied to other parts of the longwave spectrum as well.

It is important to understand that this is not the sort of book you're likely read from cover to cover. Rather, it is a collection of articles loosely arranged by subject matter. The articles in the book are grouped into the following six chapters:

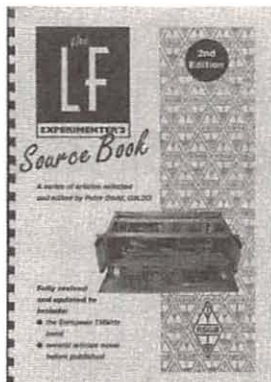
- General low frequency information
- Antennas and propagation
- Low frequency receivers
- Low frequency transmitters
- Specialist techniques
- Measuring and modeling

In my opinion, the print quality of the book leaves something to be desired. Instead of using traditional offset printing, the book has been photocopied. This is fine as long as precautions are taken to properly screen photos and center the text on the page. Unfortunately (in my copy, at least) it appears that some shortcuts were taken in these areas.

For example, one photo (page 5.14) is virtually a black box that is totally unintelligible. Also, the text on the left-hand side of page 5.10 is clipped because the page was not properly centered during copying. All of this is quite out of character for RSGB books which have a reputation for high quality printing that is crisp and clear.

In partial defense of the book, there is a passage in the front section stating that it is not intended to be a fancy "work of art," but rather to serve as a reference "straight from those who are carrying out the experiments." To this extent, the book hits the target, and it does contain a wealth of useful information, although in a somewhat dispersed manner.

Bottom Line—Although the print quality could stand improvement, this book is well worth having on your shelf if you are involved



The *LF Experimenter's Source Book* (146 pages, comb bound) is available from the Radio Society of Great Britain (RSGB).

in any facet of LF experimentation—particularly on the license-free transmitting bands. The articles inside cover the latest work in LF experimentation and contain loads of useful data that can be applied anywhere in the longwave spectrum.

■ Ordering information:

The cover price of the book is £7.50 plus £1.25 UK post and packing (£4.00 air post to the U.S. or Canada). The best way to place an order from outside the UK is with a charge card. In this way, the currency exchange rate will be handled automatically.

For more information or to place an order write to: Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts, UK, EN6 3JE. The RSGB can also be reached by telephone at: +44 1707 659015, or FAX at: +44 1707 645105. A third option is to use their secure ordering site on the World Wide Web at: www.rs.gb.org.uk.

■ *Titanic* Revisited

In April, we covered the sinking of the *Titanic* in 1912 and the rarely told story of her brave wireless operators, Jack Phillips and Harold Bride. One thing that I (and many historians I spoke with) did not know was the exact transmission frequency of the *Titanic* distress call. The number of people alive today who may have tuned into the transmission is extremely small. I knew only that the transmission was made somewhere on the longwave band.

Thanks to a clipping from the *Evansville (IN) Press* sent in by Ed Diamond (IN), we now have a more definite answer. The clipping is based on a 1992 interview with Russel Schoene, 89, who monitored some of the transmissions

as a young boy. According to the article, Mr. Schoene had pieced together a primitive ham receiver and on the morning of April 15, 1912, was tuning across 600 meters (500 kHz). Instead of the routine ship traffic he normally heard, this morning was very different. There were hastily sent QRTs (a warning for all stations to cease transmitting), and then references to an SOS distress call heard. It was obvious that a ship somewhere on the high sea was in serious trouble.

Although Schoene didn't claim he heard the *Titanic*'s signals directly, he did monitor much of the rescue traffic, and he knew long before most people that the loss of life was far higher than originally thought. My thanks to Ed Diamond for sharing this interesting article with *MT* readers.

Speaking of the *Titanic*, I received another letter via e-mail from *MT* reader John McDermott. John says that he enjoyed the *Titanic* article and found it very accurate—with one minor error. The *Titanic*'s sister ship was the *Olympic*, not *Olympia*, as I had mistakenly referred to it. As it turns out, there were three such ships in the *Titanic* series—all ending in the letters "ic." The *Olympic* was first, the *Titanic* second, and the *Britannic* the last.

The *Britannic* was sunk by German mines in the Mediterranean Sea in 1916. The *Olympic* had the longest career of all three ships, but her record was not spotless. In the 1930s she gained the dubious distinction of running down the *Nantucket Lightship* with much loss of life aboard the lightship. After four re-fittings, extensive wartime service, and 500 crossings of the Atlantic, she was retired in 1935 with the nickname "Old Reliable."

Mr. McDermott recommends an additional book for those wanting to learn more about the *Titanic*. It is titled *A Night to Remember* by Walter Lord, who as a young boy sailed aboard the *Olympic*.

That's it for this month. See you in October.

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DX Predictions

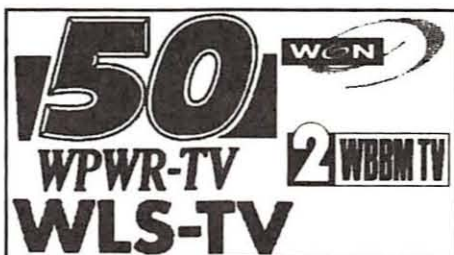
One of the more popular sections of any radio magazine are the propagation predictions. Jacques d'Avignon's monthly column of predictions can be quite helpful when you're looking for that distant station on the 17 MHz shortwave band. But how does it apply to the domestic AM band?

Propagation prediction tables are, unfortunately, not much good for the AM band. The tables are based on calculations of the maximum usable frequency (MUF), the highest frequency on which radio signals will skip back to earth rather than shooting into outer space. But the MUF is almost always well above 2000 kHz, so it's very rare for these tables to have any bearing on AM DX.

So if AM broadcast signals are always skipping around the earth, why don't you hear worldwide DX all day long? Unfortunately for the DXer, the "skip" process is not lossless. Another process, called "absorption," literally soaks up signals bouncing around the ionosphere. Absorption is worst at lower frequencies, declining as frequency increases.

AM DXers should keep a close eye on the A and K indices. These numbers are available from WWV at 18 minutes after the hour or on a variety of Internet sites. (I use a ham-radio "DX Cluster" at oh2aq.kolumbus.com/dxs/oldlook.html?) These numbers indicate the level of storm activity on the sun. Higher numbers — greater than 3 for the K index, greater than 10 for the A — indicate severe solar storms. These can cause a considerable increase in absorption, especially in areas closer to the North and South Poles.

In the Northern Hemisphere, this increase in absorption makes stations at northern latitudes weaker ... which is both bad and good. DX stations in other northern areas will be weaker



These are four of the 13 Chicago TV stations that would use the proposed new 2,000 foot tower in the Windy City.

and harder to hear. Conditions, in general, will be poorer. On the other hand, since many of the powerful "pests" elsewhere in the north will have faded away, you may get some interesting catches from the south on some of the frequencies that have opened up.

For general information on radio propagation, I can highly recommend *The ARRL Handbook for Radio Amateurs*, available from Grove. It isn't an inexpensive book, but it's a fantastic reference for anyone with a hobby interest in radio. Besides the propagation information, there's also data on construction of simple antennas, on radio theory, on sources of parts for construction projects, and just about everything else.

Expanded Band Notes

There's been quite a bit of activity in the expanded band department lately. After considerable delay (and some testing) WAWY-1670 Madison, Wisconsin, has come on the air with a news-talk format. They almost immediately adopted the calls of their old 1480 kHz station, WTDY, changing the 1480 kHz operation to WTDA.

Bob Combs KCA6RC of New Mexico reports a format change on one of the first expanded-band stations, KGXL-1650 near Los Angeles. The station is now KKTR ("K-Traffic") with — you guessed it — continuous traffic reports.

Bob is also hearing new expanded-band station KAYK-1690 Arvada, Colorado. This is the expanded-band operation of KQXI-1550 and has been running "Radio Disney" children's programming since June 5. Both stations are doing quite well into New Mexico: "Their signals are so loud here they manage to come in during daylight hours! ... losing it a little between noon and 4pm." Too many DXers shut their radios off when the sun comes up. You

might be surprised what you'll hear during daylight!

Two other expanded-band stations have been assigned new call signs. The 1700 kHz station at Sherman, Texas, is now KTBK, and the one on 1690 in Johnson City, Illinois, is now WHITE.

Chicago Megatower

Digital TV is coming, but some of the problems it will face aren't exactly technical. William Hassig of suburban Chicago sent a copy of an article from the Chicago *Sun-Times* reporting plans for a new community TV tower in that city. Currently, 13 of the Windy City's 16 TV stations transmit from either the Sears Tower or the John Hancock Center. But rents on the Sears Tower are quite high (WTTW channel 11, a PBS station, pays \$250,000 a year; commercial stations pay much more) and station engineers say the shorter Hancock Building is not technically suitable for digital broadcasts. Besides, it's reported the Sears Tower doesn't have enough space for the additional antennas and transmitters that would be required for digital broadcasting.

So, the stations propose to build a new 2,000 foot tower. The structure would be used only for TV broadcasts and would be on the west or northwest side of the city. The cost of about \$35,000,000 would be shared by all participating stations. Plans are sure to be controversial. While the stations are only considering industrial areas for the tower, it would be visible through much of the city. The mayor's office (which would have to amend zoning rules to permit the tower) told the paper it's discussed the plan but has not yet reached any conclusions.

I've started my own web page at personal.bna.bellsouth.net/~w9wi/index.htm. My DX logs and a database of TV stations are online at this address. I do not, however, hold this up as the most attractive page on the 'Net! Send your comments to Box 98, Brasstown NC 28902-0098, or by email at w9wi@bellsouth.net.

SKIPPING IN

John Vanderbeck of Las Vegas read my column in the May issue of *MT*, and sent in a list of some of the stations he's seen by sporadic-E over the years; all stations mentioned are on channel 2:

City	Station
Tulsa, OK	KJRH
Regina, SK, Canada	CKCK-TV
Houston, TX	KPRC-TV
Great Bend, KS	KSNC
St. Joseph, MO	KQTV
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ODXA Expands Scope Outside Canada

For many years, *DX Ontario* of the Ontario DX Association has been a fine monthly source of radio information, mainly on shortwave but also including DC to Daylight coverage. Their pirate and clandestine material is interesting. ODXA recently repealed a long-standing policy that only logs from Ontario residents would be printed in their magazine. If you'd like to check them out, write to ODXA, PO Box 161, Station A, Willowdale, Ontario M2N 5S8, or view their <http://www.durhamradio.ca/odxa> internet web site.

Radio Free Berkeley

Federal Judge Claudia Wilken's third ruling, this time against the long-running California micropirate **Radio Free Berkeley**, shut the station down in July. This important news is covered elsewhere in *MT*, but it's worth noting that the Steve Dunifer of the station says he and his lawyers have "lots of creative ideas to fight this thing." For the latest updates, check out their web site at <http://www.freeradio.org> on the internet.

SWRS

Short Wave Relay Service has been widely reported in North America with tests and relays from their European location. Saturday night and early Sunday around sunset are your best bet. They have been using 11470 kHz, but 13960 kHz sometimes gets out, with reports via Wuppertal (below) or via swrs@usa.net e-mail. Other Europirates are being heard on frequencies such as 5800, 6950, and 15200 kHz; it pays to tune around!

Shortwave Pirate Activity

North American shortwave pirate activity remains robust. With the end of summer approaching, pirates appear earlier in the day before and after sundown. Pirates heard by our readers last month all used frequencies within 500 kHz of 6955 kHz on your dial. Station formats and contact maildrops (when known) are listed.

Action Radio- They changed their e-mail address to awturdfeater@hotmail.com (Pittsburgh)

Alan Masysa Project- The Alan station; Parsons for rock and Masysa for DX commentary. (Providence)

Britain's Better Music Station- A Euro with North American relays of its rock music. (London)

Caribbean Sound System- Count Whip plays Caribbean music or Bob Dylan tunes. (Stoneham)

Crazy Wave Radio- Another European rocker with North

American relays. (Blue Ridge Summit)

Free Hope Experience- Major Spook plays rock or transmits in CW Morse code. (Blue Ridge Summit)

Indira Calling- They specialize in East Indian music. (Providence)

Jerry Rigged Radio- Rock music, sometimes supplemented by bagpipes, is heard here. (Providence)

KIRK- The news here is that they now have an address. (Blue Ridge Summit)

Laser Radio- This Europirate announces a regular frequency of 7145 kHz. (Merlin)

Lounge Lizard Radio- For their first anniversary show they played multiple arrangements of "Volare." (Providence)

Mystery Radio- The Shadow's distinctive sound: progressive rock instrumental music. (Stoneham)

Radio Beaver- Bucky Beaver's falsetto voice offers sly Canadian humor. (Merlin)

Radio Clandestine- R. F. Burns is back for a third decade of pirate mayhem, at least on tape. (None)

Radio Doomsday- Nemesis' rock, rap, parody, and pirate radio advocacy is back. (Providence)

Radio Eclipse- Steve Mann plays hard rock. (Providence)

Radio Free Speech- Bill O. Rights mixes satire and support for individual freedoms. (Belfast)

Radio Free Vinyl- This new one discusses freedom and the constitution. (Providence)

Radio Joystick- European rock in German, French, and English is heard here via North American relays. (Wuppertal)

Radio Nonsense- Comedy and rock from Joe Mama. (Belfast)

Radio Three- Sal Amoniac QSL's only via logs printed in *The ACE*. (None)

Radio Four- Pictured here, they feature satire about licensed USA shortwave broadcasters. (None, verifying logs in *The ACE*)

YOU'VE PROBABLY QSL'ED RADIO ONE...

YOU'VE POSSIBLY QSL'ED RADIO TWO...

YOU MIGHT HAVE QSL'ED RADIO THREE...

BUT NOW, YOU'VE CERTAINLY QSL'ED...

....RADIO FOUR!!!!



#4 in the numbered pirate station series!

Radio USA- Mr. Blue Sky's punk rock has been with us for almost three decades. (Belfast)

Radio USA (fake)- A pirate broadcasting parody; the real station uses an address. (None)

Reefer Madness Radio- Harry Anslinger attacks marijuana, but in a clumsy parody fashion. (Belfast)

RFM- H. V. Short's rock music and original parodies are entertaining. (Belfast)

Scream of the Butterfly- Their format is classic rock and rock novelty songs. (Providence)

Take It Easy Radio- Rock songs are always heard on this one. (Belfast)

WACK- Live shows feature a toll-free 800 number rock request line. (Use announced telephone number)

WBIG- Big Mike spins rock tunes and discusses the pirate scene. (Belfast)

WBLK- Rap music, mixed with parodies of pirate listeners. (Providence)

WLIQ- Oldies from the 1940's through the 1960's are heard here. (Providence)

WLIS- Jack Boggan plays shortwave broadcast station interval signals. (Blue Ridge Summit)

WMFQ- They play rock music, but mainly promote the idea of QSL's. (Providence)

WMPR- Their techno dance music is mysterious; they never contact listeners. (None)

WPIG- Tapes of Ira's imaginary land of pigs, listener calls, and the Bundymobile have resurfaced. (None)

WREC- P. J. Sparx blends rock music, comedy, and novelty tunes. (Belfast)

WRKO Shortwave- This recreation of an old rock station uses 6950 kHz and a wrkosw@hotmail.com e-mail address. (Blue Ridge Summit)

WSRR- Soul music predominates here; try Dr. Love's web site at <http://www.frn.net/stations/WSRR/index.html> (Belfast)

WUNH- Ranier Brandt heard their oldies music in Germany! (Providence)

Reception reports to pirate stations require 3 first class stamps for USA maildrops or \$2 US to addresses outside the USA. Send your letters to PO Box 1, Belfast, NY 14711, PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; PO Box 25302, Pittsburgh, PA 15242; PO Box 293, Merlin, Ontario N0P 1W0; 55D Chester Road, London N19 5DF, England; and PO Box 220342, Wuppertal, Germany.

Thanks!

Reader input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We thank the following radio hobbyists for material used this month: John T. Arthur, Belfast, NY; Shawn Axelrod, Winnipeg, Manitoba; Ranier Brandt, Hoefer, Germany; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; *Cumbre DX*; Joe Filipkowski, Providence, RI; Jesse Finnelstein, Media, PA; Ullis Fleming, Glen Burnie, MD; Harold Frodge, Midland, MI; Nick Grace, Washington, DC; Paul Griffin, San Francisco, CA; Vince Havrilko, APO Korea; William Hearty, Kent, OH; Hans Johnson, Houston, TX; Fred Kelly, Houston, TX; Zacharias Liangas, Italy; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; A.J. Michaels, Pittsburgh, PA; Gary Neal, Sugar Land, TX; Dick Pearce, Brattleboro, VT; Michael Prindle, New Suffolk, NY; Al Quaglieri, Albany, NY; Robert Ross, London, Ontario; Martin Schoech, Merseburg, Germany; Harold Sellers, Newmarket, Ontario; Lee Silvi, Mentor, OH; Kirk Trummell, Montreal, Quebec; Niel Wolfish, Toronto, Ontario; Andrew Yoder, Blue Ridge Summit, PA, and David Zartow, Janesville, WI.

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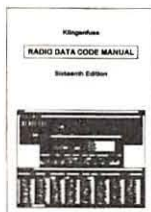


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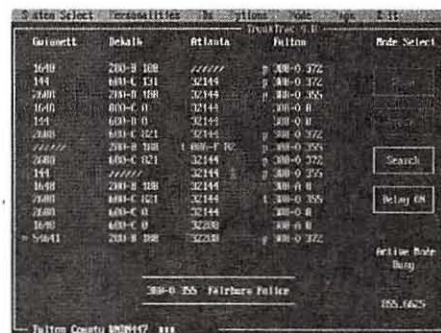
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More info: www.scannermaster.com

The Cherokee 6 Meter Hand-held

The major problem getting hams on six meter FM has been a lack of rigs for the band. Recently several companies have introduced hand held units for the band. One of the most intriguing is the Cherokee (AH-50) from Wireless Marketing Corp. The Cherokee is dedicated to six meter FM, is reasonably priced, easy to use, rugged, reliable and darned good looking.

While the Cherokee is strictly an FM transceiver, it does cover the entire band from 50 to 54 MHz. This worthwhile feature will alert you to other activity on the band even if you can't understand the signal being received; several times I was alerted to single sideband (SSB) DX openings while running the AH-50 in the scan mode.

■ Features

In transmit the Cherokee has switchable power output of 1 or 5 watts. The receiver is very sensitive; the manufacturer claims .3 μ V, but my unit has considerably greater sensitivity (less than .1 μ V will open the squelch). Tuning is by means of up/down buttons above the push-to-talk switch. And 400 mW of audio is more than adequate for normal use. A power save option can save up to 80% of the battery power.

There are five memories available and each memory can store tone frequency, tone on/off, repeater on/off and +5 kHz of information.

A speaker /mike jack allows use of a speaker mike (works well with my Radio Shack 19-310).

Physically the Cherokee is 2-1/8 inches by 5-1/8 by 1-3/8 inches, weighs less than a pound, and fits the hand very comfortably. The antenna is connected to a BNC fitting on the top left side; the squelch control is next to the antenna connector; and on/off/volume is on the far right.

Cherokee AH-50



The radio is easy to handle. There are six buttons on the face of the Cherokee. Five of them do double duty thanks to a function button.

After receiving my Cherokee and charging the battery pack it took only a few minutes till I had the unit on the air thanks to a well written illustrated instruction manual.

■ How Does It Work?

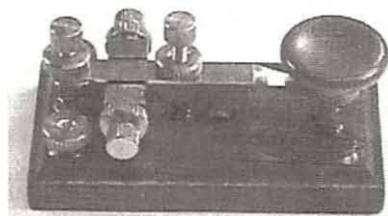
My first contact was with a ham about ten miles away on 52.525 MHz simplex. The report was excellent considering I was using the rubber duck antenna that came with the unit. Several local repeaters were easily accessed using the rubber ducky.

A band opening later in the week allowed me to work several midwestern states while running only one watt to a half wave vertical.

I put a two element, six meter quad on the roof of my house (about 20 feet above ground) and found I could work simplex as far as 75 miles without a problem. Using the quad with the Cherokee has allowed me to work 63 grids on simplex as of this writing.

Cherokee has several accessories available the user might find useful, for example, a 28-inch super flex antenna (SA-5) which should allow much greater range for portable use. And the MA-27 mobile kit allows the Cherokee to be powered by the cigarette lighter in your car, and direct connection to the mobile antenna. Several battery/charging options are also available.

I like my Cherokee a lot, and take it with me everywhere. For the price (around \$249.95) this little rig cannot be beat. To find out where you can see/purchase a Cherokee and latest pricing information call 1-800-259-0959 or visit their web site at: www.wirelessmarketing.com.



GMP miniature straight key (Milestone Technologies)

■ 6 Meters in CT

From Glastonbury, Connecticut, Mike Roberts, N1RFM writes to tell us about the K1JCL six meter AM repeater in Vernon, CT. The transmitter site is located on Box Mountain at an elevation of 1000 feet above sea level. The receive site is in Coventry, CT, at 800 feet elevation.

Input frequency is 50.400 MHz, output is 50.500 MHz. This is an open repeater and serves New York, Connecticut, Massachusetts, and Rhode Island on a regular basis. Thanks for the info, Mike.

■ Milestone Technologies

Morse code keys manufactured by LTA in Spain are now available from Milestone Technologies. The keys are hand assembled on polished wood bases with solid brass mechanical parts (optional gold plating available).

Included in the LTA offering are three straight keys, a semi-automatic bug, a combination straight key and paddle, and a side-swiper or cootie key.

Prices are quite reasonable; for example, the GMP miniature straight key is priced at \$49.00 and can be gold plated for only ten dollars more. The most expensive unit is a combination dual paddle/straight key for \$119.00 in brass or \$139.00 in gold.

For more info contact Milestone Technologies at 3140 Peoria St. Unit K-156, Aurora, CO 80014-3155, phone 303-752-3382, or visit web site <http://www.Morsex.com> or <http://www.mtechnologies.com>. Tell them MT sent you.

Keep the letters and info coming, gang. Remember DX season is just beginning; check out the antenna system and get ready for some great band openings this year.

Motorola's TalkAbout+ FRS Transceiver

Of all the companies that have entered the potentially lucrative Family Radio Service market, none has done so with power of Motorola. Already known as a manufacturer of high-quality communications gear, Motorola is backing the launch of its TalkAbout® two-way radios with a considerable war chest. For example, Motorola has hired a public relations firm to publicize the TalkAbout radios. To my knowledge, no other company in the FRS market has done so. In addition, advertising for Motorola's FRS radios is popping up in all kinds of places. Open a copy of *Family Fun* magazine, and you'll find the TalkAbout.

So it was with more than a little interest that I began the test of Motorola's top of the line TalkAbout Plus. The first thing that struck me about the TalkAbout+ is its appearance: it doesn't look like a regular, straight, cool hand-talkie; it looks, well, FUN. My wife took one look at the yellow-and-black transceiver and said, "This radio is mine!"

With its rounded case (which can be parked upright on a flat surface), chunky look, striking color scheme (it comes in five different colors), and only six controls, the TalkAbout+ looks very unimposing. At the upper right of the front panel is an orange Power button; slightly to the left, Up and Down buttons; about an inch below them, a Monitor button for defeating the auto-squelch. At the top left corner of the front panel is a volume wheel; to its right, a liquid crystal display that shows channel, code, and battery condition; below that, a Code button for setting what Motorola calls Interference Eliminator Codes, and next to it, an opening for the microphone. At the bottom of the front panel is a grill for the speaker.

Surprisingly, in the dead center of the radio you'll find the push-to-talk switch. One of Motorola's publicists says the button was placed there to make operation equally dexterous for left and right handers.

On top of the radio is a chunky rubber ducky antenna. On the left side of the case, a plastic flap lifts to reveal jacks for a whole slew of speaker and microphone accessories. On the back of the case, you'll find a large plastic belt clip and a black plastic panel that slides off to provide access to the battery compartment. The transceiver is powered by three AA batteries that, according to Motorola,

The Motorola TalkAbout+ delivers first-rate performance and exceptionally loud audio.



provide up to 30 hours of use — three hours of talk time, 27 hours of standby time.

With the radio off, press the power button and hold it for two seconds, and the transceiver will announce, in a funky robo-voice, the current channel and code to which the radio is set. To turn the transceiver on without the announcement, press the power button until the radio beeps once, then release. When the radio is powered up, a small light emitting diode (LED) indicator next to the antenna blinks to remind you that the TalkAbout+ is activated. To turn it off, press the power button until the radio beeps once, then release the button.

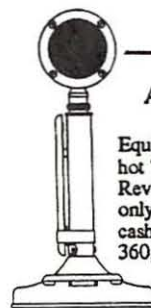
To change channels, simply press the Up or Down button. To set an Interference Eliminator Code (really a Continuous Tone Controlled Squelch System or CTCSS code), press the Code button, then use the Up and Down buttons to select the code of your choice. This is, hands down, the easiest code-setting scheme I have seen yet. With the code set, all other transmissions, except those on the same channel using the same code, are blocked. This makes it easy for members of a group to communicate with each other while eliminating a lot of interference.

When a code is set for one channel on the TalkAbout+, it is applied to all channels. Unlike some FRS transceivers, it is not possible to set a code for one channel and not for another, or to set different codes for different channels. In addition, there is, as nearly as I can tell, no means of locking the radio to prevent inadvertent changing of channels or codes.

The performance of the TalkAbout+ is exceptional. Transmit range is equal with other FRS transceivers that produce a full half-watt of power. The receive audio is clear and is the loudest of any FRS transceiver tested to date. That can be exceptionally handy if you're in a noisy environment and someone is trying to reach you.

Motorola offers a number of accessories that make the TalkAbout+ very attractive for specialized applications. These include a remote speaker microphone; a voice-operated transmit (VOX) headset; a VOX earbud with in-line microphone; arm, shoulder and fanny packs; a waterproof bag, a 12-volt vehicle adapter, and more.

Suggested retail price of the TalkAbout+ is \$179 per radio. For retailer locations, call 1-800-353-2729 or visit www.motorola.com/talkabout.



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The Right Antenna for the Frequency

Frequency of operation is an important consideration in determining which antenna design you choose for your monitoring. The main factor determined by frequency is the antenna's size. Other considerations related to size include weight, difficulty of erecting, magnitude of maintenance problems, and cost. This month let's take a look at how these factors vary with some common antenna designs.

■ Beam Antennas

Antenna element size decreases as antenna operating frequency increases. Thus an antenna designed for use on the ultra high frequency (UHF) band appears to be but a tiny toy compared to the same design when used on high frequency (HF) — the HF beam will be on the order of 100 times larger than the UHF beam! Because of this frequency differential we find that, from perhaps 50 MHz or so and higher in frequency, antenna designs such as the Yagi or quad are of a practical size, weight and cost.

On the other hand, such antenna designs — even if used on the HF band with many fewer elements than at VHF or UHF — will still be large and hard to handle. If you have the proper resources they can still be a practical choice, but even then an HF beam is usually no more than four elements for the Yagi and three for the quad.

Beam antennas can have excellent gain and directivity. If equipped with a rotor they can be pointed to any compass direction you wish. Their gain in the favored direction, coupled with their rejection of noise and interference in non-favored directions, improves communications considerably over antennas lacking such features.

■ Wire Antennas

Because of the problems mentioned above, beam antennas are not so common on HF and lower bands as on very-high frequency (VHF) and higher. Antennas of a more practical size, weight, and ease of installation are therefore needed — which (along with lower cost) accounts for the popularity of wire antennas on the HF bands.

The horizontal halfwave dipole, horizontal random-length long wire, inverted-V, sloper, and horizontal trap or coil-loaded dipoles are probably the most popular of the HF wire antennas. Longwire-beam designs offering gain, such as the rhombic, vee, and longwire, are seldom used today due to their very large size. Nevertheless they are good performers.

The directional characteristics of reception patterning of the various wire-antenna designs varies from moderately nondirectional for horizontal dipoles (practical dipoles have shallow nulls), to fairly nondirectional for inverted-vees, to moderately directional for slopers, to very directional for the longwire beams. Directionality of the random-length wire will vary as the length varies.

In general these antennas will have better low-angle patterning as they are erected higher above the ground. As the low-angle radiation increases, DX (long distance) performance generally improves. When closer to the ground these antennas usually have more high-angle vertical-receptivity patterning, leading to better short distance reception.

Wire antenna designs can also be utilized on the higher frequencies, but there they are usually constructed of tubing. Nevertheless, because the popular tubular-con-

struction beam antenna designs and groundplane designs are relatively easy to implement at VHF and UHF, there is little incentive to utilize wire antenna designs on the VHF or higher bands.

■ Vertical Antennas

At VHF and higher frequencies, vertical-whip and groundplane antennas are of quite reasonable size even for designs with lengths greater than the basic quarterwave configuration. As we move into the HF band quarterwave whips and groundplanes are still practical for many installations.

But, as we move lower down that band both inductive and capacitive loading (adding an inductor in series with the antenna, or a wire "top-hat" as a capacitor) often become necessary to keep the antenna's height practical. For HF use, popular vertical antennas include groundplane antennas, grounded-quarterwave, and the popular all-band verticals sold by various ham-equipment manufacturers. All of the vertical antennas described above are nondirectional, and have predominately low-angle vertical reception patterning.

■ Special Size Constraints

Some radio-receiving sites leave little room for antennas. One example of this is where the operator lives in an apartment with severe antenna restrictions; use of a receiver in a hotel room while traveling is another. Receiving antennas which often give good service in such situations include active antennas, desktop loops, and short whips and short random-length wires.

Active antennas are generally nondirectional and have good amplifier gain. A few have coil antenna elements, and therefore have useful nulls in their reception patterns. They are useful from low frequency (LF) to UHF, but are subject to intermodulation distortion and desensitization problems if used near a powerful transmitter. Desktop loops are popular on LF, medium frequency (MF), the AM broadcast band, and even into the low-frequency end of the HF band at times. They have very low gain, but can null-out interference in many cases, and often have low received-

TABLE ONE

ANTENNA	COMMON BANDS	DIRECTIONAL	VERTICAL ANGLE
3-ELEMENT YAGI	UPPER HF, VHF, UHF	HIGHLY	RELATIVELY LOW
2-ELEMENT QUAD	UPPER HF, VHF, UHF	HIGHLY	RELATIVELY LOW
HALFWAVE DIPLOLE	MF, HF, VHF, UHF	RELATIVELY LITTLE	HIGH TO MODERATE
HALFWAVE INVERTED-V	MF, HF	NO	MODERATE TO LOW
HALFWAVE SLOPER	MF, HF	MODERATELY	MODERATE TO LOW
1/4 WAVE GND PLANE	LF, MF, HF, VHF, UHF	NO	MODERATE TO VERY LOW
TABLE-TOP LOOP	LF, MF, HF	NULLS	MODERATE
WHIP	ALL BANDS	NO	MODERATE TO LOW

noise. For short whips and short random-length wires see the note on signal-to-noise ratio (s/n) below.

■ In Closing

This survey has been oriented toward general considerations useful in choosing your antenna for the desired frequency or frequencies of operation. There are many books available which cover the antennas discussed, as well as other popular antenna designs. Two good books are *The ARRL Antenna Book*, and Bill Orr's *Antenna Handbook*. In a less organized fashion the *ARRL Antenna Compendium* series covers a large amount of interesting material about antennas and their use.

A final note on a sometimes puzzling occurrence which often tends to equalize performance between some antenna designs, regardless of their size: On the one hand, in many applications, there is considerable difference between the performance of various antenna designs utilized for reception. Outstanding performers include antennas featuring desirable directivity, or desirable vertical-angle receptivity patterning consistent with their application. On the other hand, particularly when comparing these with the simpler wire antenna designs used for HF or lower-frequency reception, many operators notice that signals received on one antenna can usually also be received on their antennas of other designs as just well.

The reason for this "leveling of performance" between some antenna designs is that received-noise level is often sizable at HF and lower frequencies. The resultant high signal-to-noise level (s/n) essentially determines quality of reception. Often the s/n doesn't change with greater signal input from a "better" antenna because received-noise increases along with the signal. Thus the s/n is not significantly improved, and quality of reception is not improved.

RADIO RIDDLES

■ Last Month:

I said "What is the relationship between the 'knife-edge' phenomenon, the earth's curvature, and ground waves below about 3 MHz?"

Well, the knife edge phenomenon, or knife-edge diffraction, is the effect that RF signals undergo when propagating past an obstacle in their path with a "sharp" top. This allows VHF communications beyond the oft-mentioned line-of-sight propagation

path for these frequencies. For instance, when a VHF signal propagates across the top of a ridge, some portion of the signal is often diffracted downward in the direction of wave travel such that the signal can be received in the valley below the ridge.

Below about 3 MHz the curvature of the earth is sufficiently like a "knife edge" in relation to the longer wavelengths produced by these frequencies such that the signals are diffracted downward along the surface of the earth. This continual bending of the wave path gives us what is known as a "ground wave." These ground waves can propagate far beyond the horizon. They can even support communication completely around the world if sufficient signal power is utilized.

■ This Month:

What was the first antenna?

You'll find an answer for this month's

riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, 73

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Update on Computer Networking

My June-98 column presented the simple mechanics of local area networks (LANs) for those who have two or more computers. Your overwhelmingly favorable response to that article prompts me to offer (in the immortal words of Paul Harvey), the rest of the story. That column is fairly vital to this month's article, as well as for the background material and references. You should save it or contact *MT* directly for a reprint or the back issue.

First, a word for those who aren't interested in computers: believe me, I empathize. I still remember when I had no desire to mix radio and computers. Even after cosmic forces changed my mind, I wanted to mix radio only with my ancient Apple IIe computers. I loathed thoughts of learning MS-DOS, and Windows 2.x. So, the cosmic billy clubs thumped me again.

Cosmic cudgels might not disturb your equilibrium, but the tidal forces of the radio industry and market surely will, sooner or later. Radios and computers are married, probably until death do them part. So if computers don't interest you yet, that's okay. Save my "computer" columns for posterity....the day may come when you will cherish them.

■ 10Base-2 Networks Revisited

The simple, low cost, 10Base-2 coaxial cable ethernet network discussed in the June-98 column tremendously increases the power and flexibility of the personal computer when two or more are networked together. This kind of LAN requires only a low cost Network Interface Card (NIC) per computer; one BNC "tee" adapter per NIC; a length of RG-58 coax between each NIC; and a 50-ohm termination cap on the BNC "tee" of each of the two end computers.

Though the 10-Base-2 network probably remains the best choice for the casual hobbyist and neophyte networker (coax cable networks are cheap and uncomplicated), they can be trouble-prone, cranky, and persnickety when everything's not perfect. Not only that, but some things can't be done with a 10-Base-2 LAN that on a 10Base-T network are a piece of cake.

If you've set up a simple 10-Base-2 LAN, study the better 10Base-T variety. As you will see ahead, the two types of LANs can coexist — you

won't have to immediately replace the former with the latter, should you want to upgrade.

■ 10Base-T Networks

Slightly less simple, somewhat costlier, but more reliable and flexible, a 10Base-T ethernet "star" network is shown in Figure 1. Disregard the "cable modem" portion of Figure 1 until you've read ahead. For now, just "see" the three PCs and the hub.

A different type of cable and an external device called an Ethernet Hub characterize the 10Base-T. The cable, called UTP (universal twisted pair), consists of four twisted conductor pairs inside an insulated jacket. The "star" topology of 10Base-T starkly contrasts with the end-to-end serial layout of 10Base-2 networks. Other than the physical differences, the two types of networks are functionally the same.

If you took my previous advice for "combo" NICs, then you won't need new cards. You'll just need Category 5 UTP cable, an RJ-45 modular plug on each end of the UTP cables, and one ethernet hub.

If you haven't networked your computers yet, review my June-98 article and this month's, side by side. If you take a leap of faith for the better 10Base-T network, first absorb both articles in full before you decide. Either one can open barn doors for you.

■ UTP Cable

The correct type of cable is "Category 5 UTP," examples of which include Belden

1583A and Belkin A7L504, but there are many others.

The UTP cable terminates at each end with an RJ-45 modular plug, similar to, but larger than the common RJ-11 modular telephone plug. A special crimping tool is required to install RJ-45 modular plugs onto the ends of the UTP cable. This tool adds to the cost, but not prohibitively. Cat 5 UTP cable costs about 7-15 cents per foot in bulk — more if you buy it cut to length with RJ-45 plugs already attached. You decide.

Unlike coaxial cable in 10Base-2 networks (7-ft. min), UTP cables can be of any length to a maximum of 323-feet. Figures 2 and 3 show the necessary wiring and connection schemes for UTP cables and RJ-45 plugs. Figure 4 might prove helpful.

The TIA/EIA-568 industry standard specifies either of two wiring schemes to be employed in Category 5 UTP installations. The only difference between the T568A and T568B schemes is that pairs 2 and 3 are reversed. Although 10Base-T only needs two pair, all four pairs must be terminated in either the T568A or T568B scheme. The T568B scheme is the most popular. One color-code scheme should be consistent throughout a system, but particularly end-to-end of any one cable. The important thing for you is not so much the scheme, but the actual pair connections. Stick to the scheme in upper half of Figure 3 and you'll not go wrong.

The wiring scheme for ready-made or pre-existing cables can be determined by comparing wire colors in plugs held side by side. You can see through the clear plastic RJ-45 plugs. In worst cases, use an ohmmeter for end-to-end continuity checks.

■ The Hub

Ethernet hubs used to scare me. Not now! Relax and think of it as a "black box," with a place to plug in a DC wall cube and several UTP cables with RJ-45 modular plugs. That's it! You don't need to know what's inside a hub or how it works.

Hubs are cheap, if you shop. I've seen basic 5-port ethernet hubs for as low as \$19, and 8-port hubs for \$49-\$89. An ideal hub for the hobbyist probably has 5 to 8 ports; a special separate port designated as an "Uplink Port" (see ahead); and one BNC port to

FIG-1: 10BASE-T NETWORK

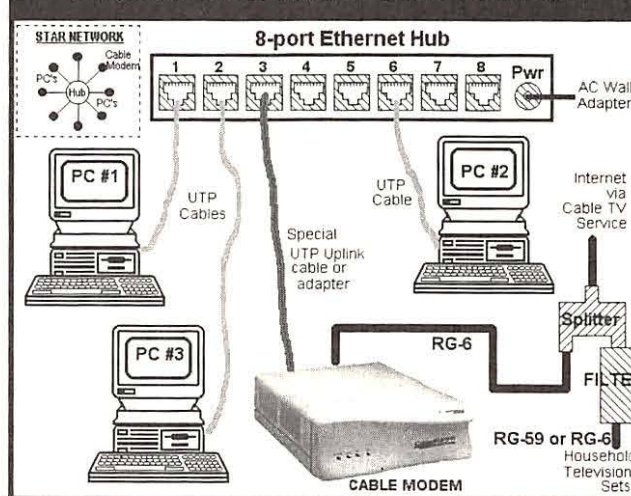
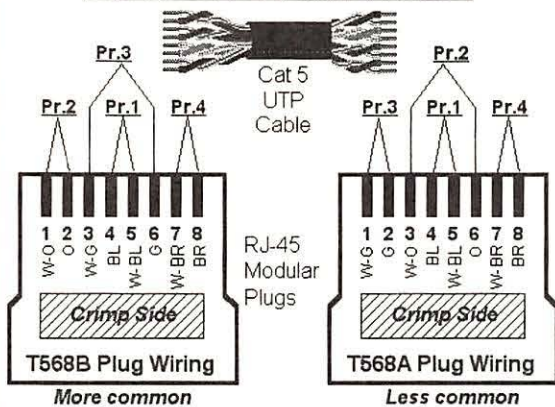


FIG-2: UTP PLUG WIRING

Standard T568 Wiring Schemes



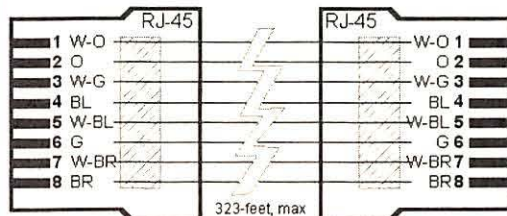
Standard UTP Color Codes

Pair 1: White-Blue (W-BL) and Blue (BL)
 Pair 2: White-Orange (W-O) and Orange (O)
 Pair 3: White-Green (W-G) and Green (G)
 Pair 4: White-Brown (W-BR) and Brown (BR)

FIG-3: UTP CABLE WIRING

NORMAL UTP CABLE-PLUG WIRING

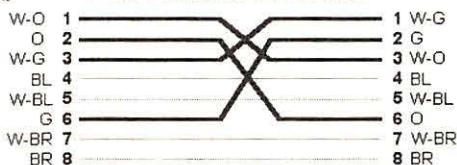
Used to connect a PC to a hub



SPECIAL UPLINK OR CROSSOVER WIRING

Used to connect one hub to another hub, or a hub to a router, bridge or cable-modem.

See text



See text

Usually short, can be a cable, an adapter plug, or an Uplink jack on the hub.

accommodate 10Base-2 network connections. LinkSys, Inc. makes a variety of low-cost hubs: <http://www.linksys.com/>

If you'll never connect to a coaxial cable network, then you can dispense with the BNC port on the hub, but you really should require that your hub have either an "Uplink Port" or a loose Uplink Adapter; or an Uplink Cable. Any of the three will do.

■ Odds 'N Ends

An Uplink port, cable, or adapter is a rough equivalent of a "null modem" cable or adapter in RS-232 and serial port applications. If you don't know what that is, don't worry; just see the lower half of Figure 3 that shows how the two active pairs are crisscrossed to make an Uplink connection. You can make an Uplink cable from the lower half of Figure 3. An Uplink adapter is a short cable segment with a male RJ-45 on one end and a female RJ-45 on the other.

So long as your network is small and is never connected to the outside world, you may never need an Uplink port, cable, or adapter. But let's suppose you get a 5-port Hub for your 3-node network, and a few months later, you add three more PC's. Your first inclination might be to junk the 5-port hub for a new 8-port model. You really need only another 5-port hub and an Uplink connection between the two to effectively bind them into one Hub! The docs that come with the hub will explain this.

Figure 4 portrays RJ-45 modular plugs, a typical modular plug crimping tool; and an RJ-45 in-line coupler for joining two shorter UTP cables into a longer one. You just never know.....

A mail order source for low-cost net-

work supplies is MilesTek; 1506 I-35W; Denton, TX 76207-2402; (800) 524-7444; Web: www.milestek.com and E-mail: milestek@milestek.com

Windows 95/98/NT simplify 10Base-T setups. If you don't have a "combo" NIC, you'll need one with a female RJ-45 port for each PC, but they're cheap.

■ Going Wild

If you ever get a wild hair to connect your home and shack to the Internet, the simplest way is with a 10Base-T network and a hub. Obviously, your computers connect to the hub, but it then connects to whatever device that

interfaces to the outside world.

One upcoming and low cost means of high speed, full time connection to the Internet is a "cable modem" (see Dec-97 column). Figure 1 shows how you can connect the vast treasure-trove of the Internet straight to your home network. The "cable modem" (not really a modem), functions as a router or a bridge between a LAN and the local cable TV ethernet network.

More and more cable TV companies are bringing high speed (10 Mbps), full-time (24/7/365) Internet connectiv-

ity to the home. The thing is, you cannot connect a home 10Base-2 (coax) LAN to a cable modem, but it's easy with a 10base-T network and a hub.

Imagine the Internet in each room of your home and shack! Imagine on-line, real-time collaboration with your radio buddies, even to the extent of using "Network DDE" to control and operate each other's computer-controlled radios (like WiNRADiO) for benefits of space and frequency diversity reception! You might be in New Jersey and your buddy in New Zealand; but thanks to the Internet and a 10base-T network, you just might be able to run each other's radio stations.....and a whole lot more!

You see, Windows 95/98/NT offer a slick concept called VPN (virtual private networking) where you and friends can securely connect your LANs as one via the Internet. So if you think this is a computer article, perish the thought. It's got radio pasted all over it. Let your imagination run amok. Open up your mind and let your fantasies unwind. Radio can take on a whole new dimension with a 10base-T network connected to the Internet.

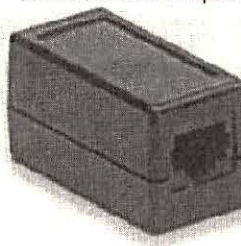
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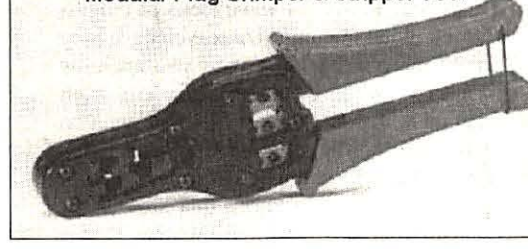
FIG-4: UTP ACCESSORIES



RJ-45 In-Line Coupler



Modular Plug Crimper & Stripper Tool



A Simple Antenna for Shortwave

August is a good time to check out your antenna farm and plan for the upcoming contest and DX season. This month we will take a close look at a multi-band antenna and explore why some HF antennas work so well while others fail to perform as expected.

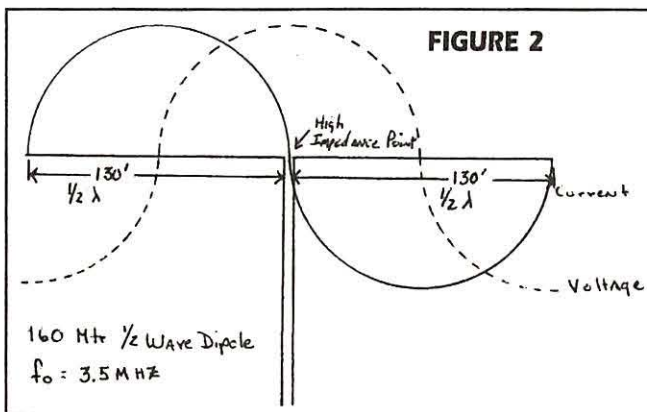
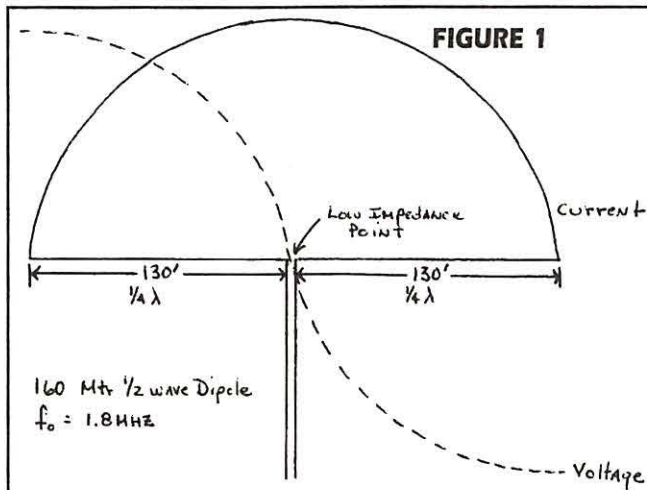
Although I live in a city, my property allows me to experiment with some rather large wire antennas. Since my main interest on HF is shortwave DXing and low power operating (QRP) I am always on the alert for some new wire antenna that might give me the edge on 80, 40 and 30 meters and that I can press into service on the SW bands, as well.

Last year, I read an article in a radio magazine about an extended double Zepp antenna for 40 meters. My current HF wire workhorse antenna was a full size 80 meter double Zepp, a 134 foot long dipole, fed with 450 ohm ladder line via an antenna tuner. This antenna worked well on 40 and 30 meters, but only marginally on 80 and not at all on 160 meters.

Enter the 40 meter extended double Zepp (henceforth called the EDZ) antenna. This dipole type antenna has an overall length of 180 feet (90 feet per leg) and is fed with either open wire feedline or 450 ohm ladder line. According to computer modeling, this EDZ should provide about 3 dBd gain on 40 meters and resonate on 160 through 10 meters, including the SW broadcast bands. My interest was piqued, and I just had to investigate.

The *ARRL Antenna Book* describes the EDZ as a form of collinear array antenna, where the two $1/2$ wavelength elements are operated in phase which, in turn, produces a gain over a common dipole. The idea behind the EDZ is to make both legs of the antenna slightly longer than a half wavelength (about .64 wavelength, to be exact) at the operating frequency. This moves the actual half wavelength segments slightly farther apart (electrically) and increases the gain of the array. Each leg of the EDZ is 90 feet long. This is just slightly longer than the .64 wavelength required for a true 40 meter EDZ array, which fits the model in the *ARRL Antenna Book*.

Why does the EDZ antenna work as a



multiband antenna on 160 through 10 meters? The theory has to do with nonresonant wire lengths. Look at the 160 meter half wave dipole antenna in Fig 1. Each leg is $1/4$ wavelength long. Notice the RF current and voltage distribution along the element legs. At the feedpoint, the impedance is low and the RF current is high while the RF voltage is low. This is an ideal condition for feeding the dipole correctly.

If you take this dipole and tune up on 80 meters (a multiple of 160 meters) the feed point impedance would be extremely high. This is due to the $1/4$ wave element lengths for 160 meters being a $1/2$ wavelength long on 80 meters (Fig 2). Since you are now trying to feed an 80 meter full wavelength antenna in the center, you will encounter an extremely high feedpoint impedance. This results in a huge amount of RF voltage present at the feedpoint, conditions that are exactly opposite that of a $1/2$ wave antenna. This is the main reason resonant dipoles do not work

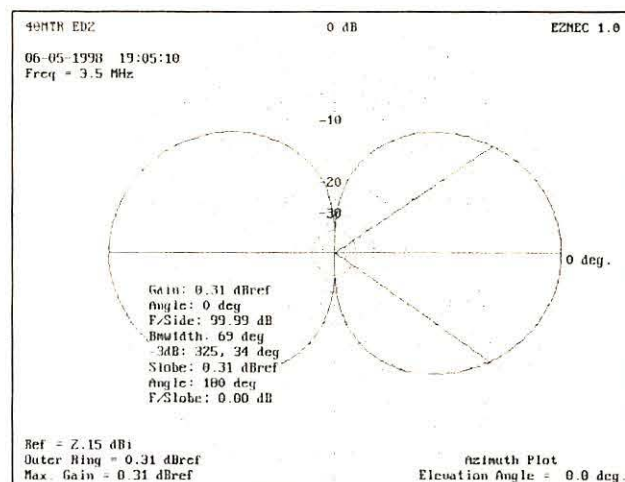
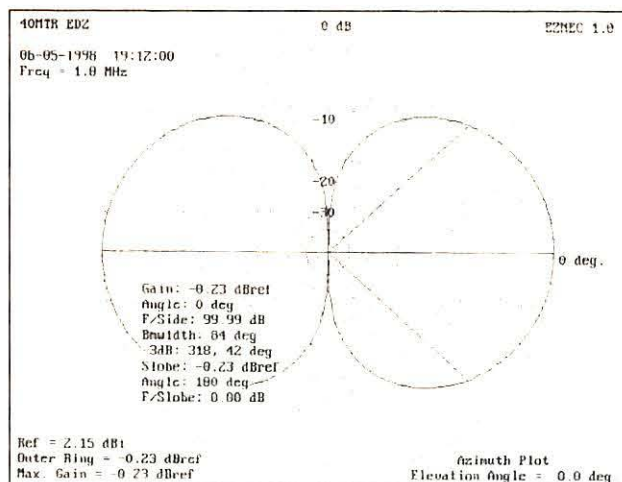
well on harmonically related bands (i.e., 160-80-40-20-10 meters).

However, if we make the element lengths nonresonant on the various bands (i.e., our EDZ with its 90 foot legs) we can then present reasonable impedances to the antenna tuning unit that it can easily match from 160 through 10 meters which also includes the SW bands. We are not feeding the EDZ at a RF voltage peak; instead it is being fed somewhere in between the voltage and current peak.

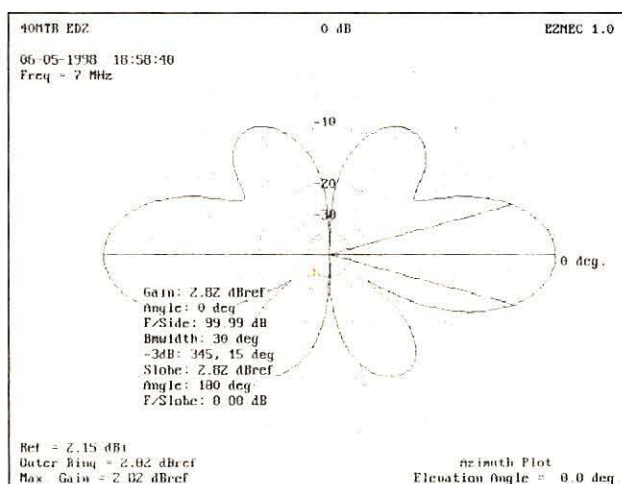
It's no secret that by using a balanced feedline antenna tuner (ATU) and open wire feedline or 450 ohm ladder line you can take a non-resonant dipole antenna and turn it into a multiband antenna. The ATU disguises the feedline impedance excursions at the transmitter end of the antenna system so the transmitter "sees" a 50 ohm source. Using this idea, it is relatively easy to see how the EDZ can be made to resonate on 80 meters, since each leg is longer than a quarter wavelength for that band. On 80 meters the EDZ performs like the plain vanilla dipole with little gain. On 40 meters the EDZ behaves like it is supposed to and provides almost 3 dB of gain over a dipole (dBd).

Looking at the EDZ performance on 160, the 90 foot legs of the EDZ are much too short for even half wave dipole performance on this band. However, since the leg length is nonresonant on any odd or even multiple of a $1/4$ wavelength on 160 meters, the antenna will operate as a short dipole with a slight loss of gain on this band. I have been able to make this antenna work successfully on 160 using the ATU, although the bandwidth on 160 is extremely narrow and requires retuning the ATU if moving more than 30 kHz. At least I can tune this antenna on 160...something I was not able to do with my old 80 meter Zepp.

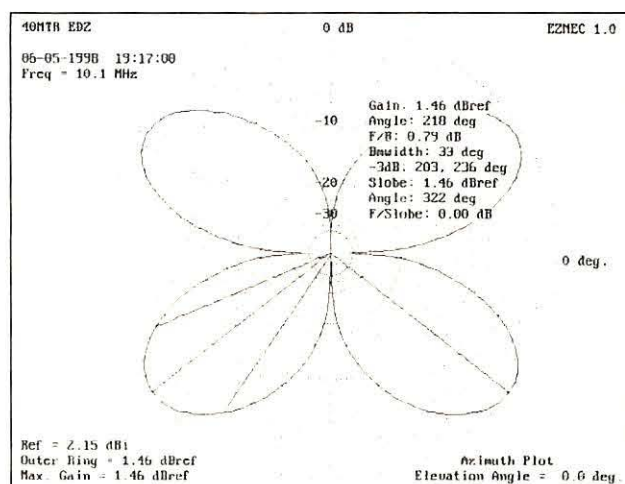
I have included some plots from W7EL's EZNEC antenna modeling software to show current distribution and free space radiation patterns on the 40 meter EDZ for 160, 80, 40, 30 and 20 meter ham bands. Using antenna modeling software makes it much easier to get a feel for how antennas work and whether or not they will be able to perform as predicted



160 and 80 meter performance for the 40 meter EDZ are pretty much alike. In both instances the free space radiation pattern looks like a classic dipole antenna: a figure 8, broadside to the wire. Gain on 80 is only .31 dBd while there is loss of gain on 160 of -.23 dBd.



In 40 meter performance the two major lobes have become very pronounced and four smaller lobes have appeared. Gain is 2.8 dBd on 7 MHz. The pattern is broadside to the antenna wire. On air performance is much better than my old 80 meter double Zepp.



30 meter performance of the EDZ shows a much more skewed radiation pattern, with four major lobes and two major nulls, at right angles to the wire. The EDZ exhibits a 1.46 dBd gain on 30 meters but be careful when erecting this antenna that the lobes are positioned properly to enhance reception from the areas you are interested in.

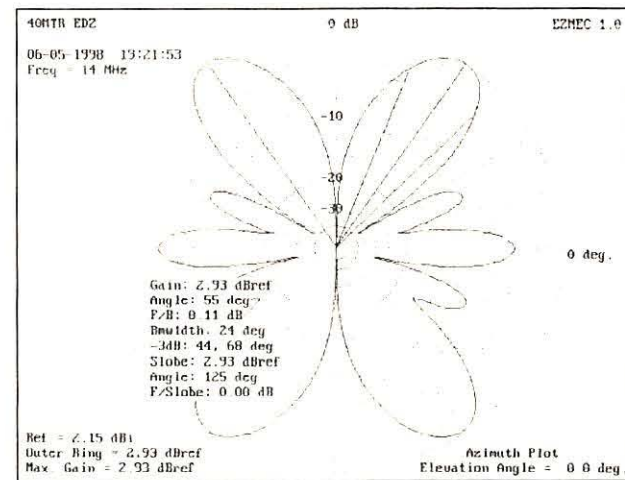
or advertised.

While we have dwelt on the ham radio bands regarding this EDZ antenna, rest assured this antenna works great on the SW broadcast and utility DX bands, too. I use it constantly with my Heathkit SB-303 SW receiver and it works like gangbusters! While most SW and utility DXers are not too worried about antenna impedances and the ability of an antenna to radiate a signal, the sheer size of the EDZ antenna makes it a real signal grabber for the SW enthusiast.

For initial tuning data, I rely upon my MFJ Model 259 antenna analyzer hooked into the antenna tuner. On 160, 80 and 40 meters, I usually make three to four measurements at the low, middle and high end of each band. These tuner settings are noted on a piece of cardboard and are used as a reference for rapid band changes. The same goes for the SW bands. Pick your favorite frequencies on the 90, 60, 49 and 41 meter bands, and use an antenna analyzer or antenna noise bridge to correctly adjust the tuner. Record these settings for quick band changes.

If you have the room to erect this antenna, I highly recommend doing so. Remember: wire antennas provide the biggest bang for the buck in radio, are ultra inexpensive to construct, and are much lower profile than a large rotatable array.

Until next month, enjoy your new HF antenna and remember to Keep It Simple.



20 meter performance of the EDZ is a little more bizarre. The four major lobes have become more enhanced and six minor lobes have appeared, at right angles to the wire. Gain (as measured on the major lobes) is almost 3 dBd, but care must be taken when erecting this antenna to assure proper positioning.

Welcome to Military Monitoring

As the *USS Nimitz* pokes her bow into the wind, a navy pilot taxis his E-2C Hawkeye off the ship's elevator in preparation for launch. From his privileged position in the cockpit, he scans the flight deck. A crew of multi-colored jerseys scurry about below. As he moves his aircraft towards the catapults and his launch from the ship, flight deck activity accelerates.

A sailor with a yellow jersey uses hand signals to guide the pilot to the right position. Another one with a blue jersey moves to within inches of the turning propellers and attaches the cable that will link his aircraft to the ship's #1 forward catapult.

The pilot throttles his engines for takeoff. Human senses reel at the explosion of noise as the twin turboprop engines pour out waves of thunder and searing heat. "Nimitz control, Ghost 11 ready for launch on Cat 1," screams the UHF radio in air operations. "Ghost 11 has permission to launch," answers the air boss.

Hand signals are passed, deck crewmen scramble from the aircraft's path. And then it's off. The catapult slams forward, shooting the 52,000 pound aircraft from zero to 150 miles per hour in less than two seconds. NG-600 a.k.a. Ghost 11 is on its way to home base.

Shortly after take-off, Ghost 11 contacts Ghost Ops (home base) using the Global High Frequency System (GHFS) primary frequency of 11.175 MHz to report that they are now "feet dry," meaning they are over land.

This is just one example of the many types of communications that can be monitored on U.S. military frequencies. Listeners who prowl these frequencies regularly get a bird's-eye view of day-to-day military operations.

Where do you hear the military?

This is a more common question than you might think. Old hands know, but newcomers to the radio hobby struggle to hear their first military communications. Table One gives the mil monitor some of the general areas in which to look for military communications.

In the shortwave spectrum, military communications can be heard just about anywhere, but the aeronautical off-route bands



Standby to launch... A VAW-112 E-2C Hawkeye is directed onto one of four catapults on board the carrier USS Nimitz (CVN 68). (U.S. Navy photo by Photographer's Mate 2nd Class James Watson)

indicated in Table One offer the newcomer a concentrated area to search for military communications activity. Most voice high frequency (HF) military communications utilize upper sideband (USB) mode, with only an occasional smattering of lower sideband (LSB) voice communications.

If you don't live close to a military base, HF offers one of the few ways to hear a high volume of military communications. There are literally thousands of such frequencies in use by military organizations all over the world. Protecting one's nation is a 24-hour a day operation, so there is never a shortage of military communications.

Scanner Owners Welcome

Military communications are just not limited to HF. If you have a scanner, you can hear

some of the most exciting military communications available in the radio spectrum on military frequencies. Again, Table One has an extensive listing of bands and modes on which to search for activity. A good omni-directional antenna, quality coax and scanner receiver will afford the monitor a lot of interesting military traffic.

You don't need to live near a military base to hear military aircraft traffic. I live more than 90 miles from the nearest military base with aircraft, but I regularly hear air to ground communications from all sorts of US military aircraft that transit this area of rural North Carolina.

We live at the southwest edge of the Snowbird MOA (Military Operating Area) and we get regular visits by aircraft from all branches of the Department of Defense. We can hear everything from Marine and Navy F/A-18 aircraft dog-fighting to low level runs at night by Air Force B-1 and B-2 bombers.

But the secret to being successful at VHF/UHF milcom listening is knowing where to listen, being in the right place at the right time, and being very, very patient. Case in point: I have had the frequency of 225.450 MHz in my scanner for two or three years now. And it has been a very quiet frequency until recently.

Imagine my surprise in the last month to not only hear an Air Force E-8 Joint Stars (JStars) using 225.450 MHz for air-to-air communications, but Lockheed Martin used it as an air-to-air frequency for the second test of the F-22 Raptor fighter aircraft. You just never know when one of these frequencies will become active! But, you have to have it in

TABLE ONE: MAJOR MILITARY COMMUNICATIONS BANDS

Shortwave (frequencies kHz; for transmission mode, see text)

3026-3152	4700-4745	5684-5726	6685-6760	8965-9037	11175-11271
13200-13257	15010-15097	17970-18027	23200-23250		

VHF/UHF

30.00-30.55 MHz (AM/FM-10 kHz spacing)
 32.00-32.99 MHz (AM/FM-10 kHz spacing)
 34.00-34.99 MHz (AM/FM-10 kHz spacing)
 36.00-36.99 MHz (AM/FM-10 kHz spacing)
 38.00-38.99 MHz (AM/FM-10 kHz spacing)
 40.00-41.99 MHz (AM/FM-10 kHz spacing)
 46.60-47.00 MHz (AM/FM-10 kHz spacing)

49.61-49.99 MHz (AM/FM-10 kHz spacing)
 118.000-138.000 MHz (AM-25 kHz spacing)
 138.000-144.000 MHz (AM/FM-12.5 kHz spacing)
 148.000-150.750 MHz (AM/FM-12.5 kHz spacing)
 162.0125-174.000 MHz (FM-12.5 kHz spacing)
 225.000-400.000 MHz (AM/FM-25 kHz spacing)
 406.125-419.975 MHz (FM-12.5 kHz spacing)

your scanner and be there or record it when it is in use.

■ Searching for Activity

So how do you find new frequencies to monitor? The first suggestion I'm going to make is that you get a subscription to *Monitoring Times*. You're going to get a boat load of frequencies in each and every issue. Look not only in this column every other month, but also check out Hugh Stegman's *Utility World* column and loggings for new HF frequencies. A sub to *MT* is worth every penny of the \$23.95 you'll spend and you won't miss an issue if the newsstand sells out.

Second, learn to use the search button on your scanner. You would be surprised how many new frequencies I have found on my BC-895 trunk tracker in the 225-400 MHz band. (Just a hint to those looking for a new scanner for military air, the 895 is more than just a trunk tracker. It's a great conventional scanner at a great price. It is an excellent performer in the military communications band.)

But the big secret in searching the military frequencies is to keep the search limits small.

For instance, don't try to cover the entire 225-400 MHz range in one search. That's 7,000 25-kHz channels! Most scanners are not fast enough to make an effective search of a range that wide. Keep your search ranges to within one or two megahertz.

You should also search each range for more than just a day: Let it run for a week or more. Also remember that you will find more milcom activity during daylight hours (normal working hours for military folks) than at night. You should also do a month of week-ends in each search range you try (US military reservists only drill one weekend a month).

Hopefully, the information above will get you started in one of the most exciting aspects in all the radio hobby — military communications monitoring.

■ True Stories

"I live in Ridgecrest, California, which is the Home of the Naval Air Weapons Center, China Lake, where they test bombs and other weapons on the ranges on a daily basis," writes DP (a.k.a. Dr. Pepper), one of the top milcom listeners in the country. "...This conversation describing a weapon drop took place

one day:"

"Range controller: 'Inbound hot from the South, with a retarded weapon.' (Meaning the weapon had either a parachute or air brakes.)

"2nd voice: 'This is *not* a retarded weapon. It is merely aerodynamically challenged.'"

■ Milcom Frequency Spotlight

In each edition of *Milcom I* will target two milcom frequencies (HF and VHF/UHF) that should afford the monitor a lot of interesting activity regardless of his or her location.

The HF spotlight frequency for this issue is 11.175 kHz (USB): Global HF System primary. And the VHF/UHF spotlight frequency is 255.40 MHz (AM): the Federal Aviation Administration flight service station nationwide frequency (where the pilots file their flight plans while flying).

■ And Finally ...

If you have a milcom frequency or callsign list, we want to hear from you. Send it to our Brasstown mailing address or email me at the address in the masthead. See you in two months and good hunting.

SCANNER POWER! THE BC895XLT DOES IT ALL!

This top-rated Bearcat delivers all conventional communications, plus those elusive Motorola trunking signals as well! Land, sea, air, and space—with triple conversion design. Police, fire, ambulance, civilian and military aircraft, ship to shore communications, ham repeaters, business and industrial systems, even instant weather—with storm alert! Offers wide frequency coverage (29-54, 108-174, 216-512, and 806-956 MHz less cellular).

With lightning-fast scanning and searching for new signals (300 steps per second!), built-in subaudible tone squelch (CTCSS), individual-channel lockout and delay, bargraph signal-strength indicator, automatic storage of search-discovered frequencies, 10 priority channels, even a tuning dial for stepping through channels or frequency ranges!

But the features don't stop there. Data skip passes by those annoying pager tones, and you can operate your Bearcat from a computer using the optional interface cable and Scancat-Gold software for Windows! Powerful 2.7 watt audio drives the internal speaker above noisy environments, and external speaker and tape recorder jacks are provided. The 895 is powered by 12 VDC, so you can use it as a base receiver with its AC adaptor, or in a mobile installation with the optional cigarette lighter adaptor. Includes manual, telescoping whip, AC adaptor.

ACCESSORIES

ACC 15	Computer interface cable	\$29.95
BRK 2	Mobile mounting bracket	\$15.95
DCC 3	Mobile DC adaptor	\$12.95
SFT 2-W	Scancat-Gold for Windows	\$99.95

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Curious about the Concorde?

Welcome aboard! Today we have for you interesting facts about the Concorde supersonic transport, and a topic for which we have received many requests: airliner callsigns! We also include a copy of a general aviation flight plan, since most folks haven't had an opportunity to see one.

■ Facts and Statistics for Concorde

Did you know that ... ?

Concorde is the only supersonic passenger airliner in the world: British Airways and Air France are the only two airlines operating this flagship of the world's civil aviation fleet.

More than 1.3 million passengers have flown supersonically on British Airways fleet of Concorde alone since they entered commercial service in 1976.

With many regular travelers, one of the most frequent passengers made 68 round-trip transatlantic crossings in one year alone.

Today's typical Concorde passenger is a business executive, who appreciates the unique advantages that come with supersonic flight. Principal among these advantages is time saving. Cruising at 1,350 mph, or better than twice the speed of sound, a typical transatlantic crossing takes little more than three and a half hours. Traveling westward, the five hour time difference means Concorde arrives before she has taken off — in local time, at least.

For a growing band of businessmen, day trips from London to New York and back are scheduled regularly into their diaries. Around one fifth of all those on board the daily BA morning flight (BA001) from Heathrow to Kennedy will be tucked up in bed back home in the UK by the end of the day.

Some of the above do not even leave the airport building at Kennedy, using the special conference rooms British Airways makes available at its JFK terminal for their business meetings. By regular subsonic aircraft, such a journey would take two working days at least. The savings this can represent in a top consultant or lawyer's fees more than covers the price dividend charged for flying Concorde.

Quite apart from this time-savings, Concorde's passenger cabin is pressurized to a more comfortable level than on subsonic aircraft, reducing flight fatigue still further.

Today, British Airways operates Concorde

OBTAIN A PREFLIGHT WEATHER BRIEFING			FLIGHT PLAN		REMEMBER TO CLOSE YOUR VFR FLIGHT PLAN	
1. TYPE VFR IFR DVR	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE / SPECIAL EQUIPMENT	4. TRUE AIRSPEED KTS	5. DEPARTURE POINT	6. DEPARTURE TIME PROPOSED (Z) ACTUAL (Z)	7. CRUISING ALTITUDE
8. ROUTE OF FLIGHT						
9. DESTINATION (Name of airport and city)			10. ESTIMATED TIME ENROUTE HOURS MINUTES		11. REMARKS	
12. FUEL ON BOARD HOURS MINUTES		13. ALTERNATE AIRPORT(S)		14. PILOT'S NAME, ADDRESS, PHONE NUMBER, AIRCRAFT HOME BASE		15. NUMBER ABOARD
16. COLOR OF AIRCRAFT			17. DESTINATION CONTACT / TELEPHONE (OPTIONAL)			
SPECIAL EQUIPMENT SUFFIXES			/X - No Transponder /T - Transponder no Altitude Encoding /U - Transponder Altitude Encoding /D - DME, No Transponder /B - DME, Transponder no Altitude Encoding /A - DME, Transponder Altitude Encoding /C - RNAV, Transponder no Altitude Encoding /R - RNAV, Transponder Altitude Encoding /W - RNAV, no Transponder /M - TACAN, no Transponder /N - TACAN, Transponder no Altitude Encoding /P - TACAN, Transponder Altitude Encoding			

Flight Plans: For readers who have never had a chance to see what a flight plan looks like, here is a scan of the general aviation form.

scheduled services twice a day to New York, one flight leaving in the morning and one in the evening from Heathrow. Both Air France and British Airways' Concorde also operate a range of charter flights, which have taken the aircraft to more than 150 destinations worldwide.

■ Airline Callsigns

ABEX - Airborne Express
 AEROMEXICO - Aerovias de Mexico SA DE CV
 AIR FORCE ONE - US Presidential Flight
 AIR FORCE TWO - US Vice Presidential Flight
 AIRFRANS - Air France
 AIR VAN - Air-Vanuatu
 AIR ZAIRE - Air Zaire Societe
 ALASKA - Alaska Airlines, Inc.
 ALL NIPPON - All Nippon Airways, Co., Ltd.
 ALOHA - Aloha Airlines, Inc.
 AMERICAN CHECK - Flight Line, Inc.
 AMERIJET - Amerijet International
 AMTRAN - American Trans-Air, Inc.
 ANKGASA - Royal Malaysian Air Force
 ANK AIR - Air Nippon Company, Ltd.
 ANSETT - Ansett Airlines of Australia
 ANZA - Ansett New Zealand
 ARGENTINA - Aerolineas Argentinas
 ARPA - Air Panama Internacional
 ASCOT - Air Support Command Operations Task (RAF Air Transport)
 ASIANA - Asiana Airlines
 ASPEN AIR - Aspen Airways
 AUSSIE - Royal Australian Air Force
 AVIANCA - Aerovias Nacionales de Colombia S.A.
 BANGLADESH - Bangladesh Biman
 BEECH TEST - Beech Aircraft Corp.
 BIG "A" - Arrow Airways, Inc.

BLUE STREAK - USAirways Commuter
 BLUE RIDGE - United Airlines Commuter
 BIZEX - Business Express
 BRUNEI - Royal Brunei Airlines
 CACTUS - America West Airlines
 CANFORCE - Canadian Forces Aircraft
 CANFORCE 1 - Canadian Prime Minister Flight
 CARGOLUX - Cargolux Airlines International
 CARNIVAL AIR - Subsidiary of Carnival Cruise Lines
 CATHAY - Cathay Pacific Airways, Ltd.
 CAYMAN - Cayman Airways, Ltd.
 CHAUTAUQUA - USAirways Commuter
 COMAIR - Comair, Inc.
 CONNIE - Connie Kalitta Services, Inc.
 DAHL - DHL Airways, Inc.
 DEHAVILLAND - Boeing-Dehavilland Canada
 DUBAI - Dubai Airwing
 DOVE - Danube Air Ltd
 EGYPTAIR - Egypt Air
 EL AL - El Al Israel Airlines, Ltd.
 EXAM - CAA Flight Examiners
 EXECJET - Executive Jet Aviation, Inc.
 EXECUTIVE 1 FOXTROT - US President's Family Flight
 FEDEX - Federal Express
 FIRST AIR - First Air Courier, Inc.
 FLIGHT CHECK - FAA FINFO Flight Inspection Aircraft
 FORD - Ford Motor Company
 FRANCE AIR FORCE - Force Aerienne Francaise
 GREAT AMERICAN - Great American Airways
 GULF FLIGHT - Gulfstream International Airlines, Inc.
 GUY AIR - Guyana Airways Corp.
 GENERAL MOTORS - General Motors Corp.
 HAPAG-LLOYD - Hapag-Lloyd Fluggesellschaft MBH
 HAWKER - Dunsfold BAE
 HUSTLER - Exec Express, Inc.
 ICEAIR - Icelandair
 INDONESIA - Garuda Indonesian P. T.



WiNRADiO®

**From the Pioneers of Computer Controlled Radio
now comes a whole new range.**



Internal Model (WR-1500i)



*External Model (WR-1500e)
(computer not included)*



*The WinRADiO Virtual
Control Panel*



Spectrum Scope

The popular WiNRADiO WR1000i is the world's first commercially available PC-controlled scanning receiver. No wonder it has received the coveted Most Innovative Receiver Award for the Year 1998, by WRTH.

However, this fine receiver has now finally encountered serious competition:

Our own.

WiNRADiO Communications now proudly introduce a new series of radio-controlled PC-based receivers, in both internal and external versions:

- WR1000i ... 100% internal 1300MHz scanning receiver
- WR1000e ... 100% external 1300MHz scanning receiver with standard RS-232 control and optional PCMCIA (PC-card) interface
- WR1500i ... 100% internal 1500MHz scanning receiver
- WR1500e ... 100% external 1500MHz scanning receiver with standard RS-232 control and optional PCMCIA (PC-card) interface

The 1000/1500 series products offer cost-effective solutions for a wide variety of applications. The products come in two forms: internal ISA-bus cards, and compact external units with an RS-232 interface (PCMCIA interface optional).

The advantages of an internal card model are in its neatness – there are no external cables required, no external interface ports are occupied, no external power supplies or extra desk space are needed. And if you wish, nobody needs to know that you have a scanning receiver hidden inside your PC!

Multi-channel operation is simple to achieve, as up to eight WiNRADiO internal receivers can be used simultaneously in one PC.

The advantage of an external model is in its portability – the optional plug-and-play PC card interface (PCMCIA) allows a very fast and simple installation for any portable PC. Serial RS-232 interface is also available as standard.

Both models are very well shielded from PC interference. We use specially developed shielding materials and innovative design methods to prevent any interference directly entering the receiver.

Software options:

- WiNRADiO Digital Suite software for decoding of WEFAX, HF fax, packet, ACARS, DTMF, CTCSS; for signal classification, audio spectrum analysis, squelch-controlled playback and recording.
- WiNRADiO Database Manager

Hardware options (for external models):

- WiNRADiO Portable Power Source for a truly portable computer-controlled radio system, containing nickel-metal-hydrate batteries and an intelligent battery charging facility with battery charge indication.
- WiNRADiO PC Card Adaptor allows the use of PCMCIA card interfaces commonly used with laptop computers.

WiNRADiO receivers are available from selected radio dealers in North America.
See our Web site www.winradio.com for more details or email enquiries to info@winradio.com.

*Technical Specifications are subject to change without notice.
WiNRADiO, WiNRADiO Digital Suite and VISITUNE are trademarks of WiNRADiO Communications.
Availability subject to FCC certification (application pending at time of printing). Contact us for details.*

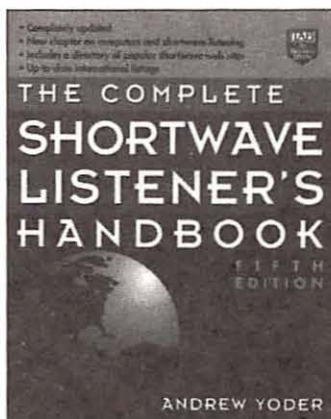
WHAT'S NEW?

TELL THEM YOU SAW IT IN MONITORING TIMES

Complete Shortwave Handbook

Over 400 pages make this 5th edition of *The Complete Shortwave Listener's Handbook* one of the largest broadside references for radio listening ever published, and veteran shortwave writer Andrew Yoder has done it well. The book presents perspectives on amateur, CB, broadcasting, pirates and clandestines, utilities, longwave and natural radio, QSLs, equipment and memorabilia collections, publications and dealers, even some tutorial hints on getting the best signals.

Fully half the book is devoted to international broadcasting, the granddaddy of hobby radio listening. The book provides history, anecdotes, and considerable insight into the stations you will



hear tonight as you tune through your shortwave dial.

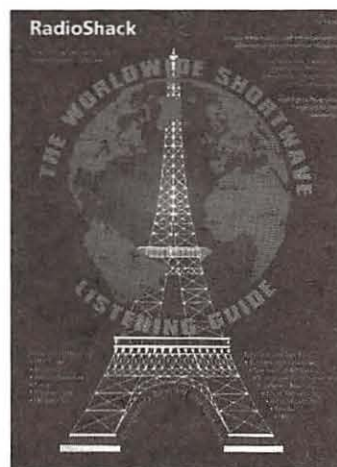
The Complete Shortwave Listener's Handbook, published by McGraw-Hill, is \$29.95 from Grove Enterprises at 800-438-8155, fax: 8282-837-2216, e-mail order@grove.net, or visit www.grove-ent.com.

Worldwide Shortwave Listening Guide

Radio Shack has come out with a completely updated second edition of *The Worldwide Shortwave Listening Guide*. The Guide is authored and edited by John Figliozzi, who also writes *MT*'s monthly "Programming Spotlight" column.

The attractive, 112-page book is wire-bound, so it can lie flat on a surface. Its main listings section provides a 24-hour guide to English language programs broadcast by 97 international broadcasting services around the world. The 7000+ listings are arranged by UTC time and include the station, days of broadcast, program title and description, as well as

the area of the world targeted and the frequencies used to broadcast each program. Programs targeted to the Americas are highlighted in bold print and there is an introductory section designed to orient the reader to the book, as well as to the basics of shortwave lis-



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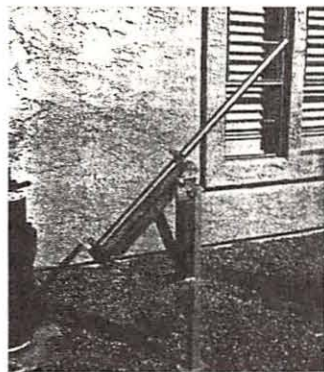
tening.

There is an expanded and rearranged cross reference for sixteen of the most popular types of programs arranged by program title. There is even a section on alternate means of accessing international broadcasts such as via Internet audio.

At \$8.99, this handy, one-of-a-kind reference book is an incredible bargain for shortwave program listeners. This second edition of *The Worldwide Shortwave Listening Guide* is available through Radio Shack. The author advises that, since there are still some copies of the first edition in stores, readers should specify that they want the edition with the Eiffel Tower on the cover.

One-Man Mast

Alpha Delta has a solution for the hobbyist who needs to be able to raise or lower a vertical shortwave antenna — a tricky operation at best, and very nearly impossible as a one-person operation. Alpha Delta's hydraulic-assisted, fold-over mounts



even make it a *one-handed* operation!

Set the steel post of the DH-1 (or you supply a 4x4 wood post for the DH-2) in concrete, attach the pre-assembled hydraulic arm, and you're in business. You supply the mast for the antenna. The fixture will safely support a 29-foot HF antenna up to 25 pounds in weight, or a five-pound VHF/UHF ground plane or discone on a 20-foot mast.

The self locking nut is adjusted by the user on the "Pre-

load/Pivot" bolt until the antenna can be raised or lowered without effort; it is locked into position with a pin bolt. Whether you lower your antenna for maintenance, to swap out antennas, or to keep the neighbors happy, this solution makes it simple.

Call Alpha Delta toll-free at 888-302-8777 and ask for the DH-1 (\$249.95) or DH-2 (\$229.95) Hydraulic Dampened Fold-Over Mast Fixture (P.O. Box 620, Manchester, KY 40962).

Palstar's R30 HF receiver

Palstar is the brainchild of Paul Hrivnak (original owner and founder of Vectronics Canada), who founded Palstar to produce a range of quality products which are distributed in North America and Europe. One of his latest brainstorms is the R30 receiver,

expected to become available later this month.

The tiny (8 inch by 9 inch) R30 will cover the shortwave spectrum from 100 to 30 kHz in AM and upper and lower side-band modes; tuning steps of 20 Hz, 500 Hz, and 1 MHz are indicated in promotional material, but Paul indicated this spec is not yet firm. Bandwidth is selectable at 6 kHz and 2.5 kHz.



Other specs as listed on the company's US website www.palstarinc.com read as follows: 45 MHz 1st IF, 455 kHz 2nd IF; 4-pole crystal filter at 45 MHz; 6-digit LCD display; analog S-meter; 100 channel memory; 6 auto switchable input filters.

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- Just use your mouse to "arm chair" the controls. Never touch the radio once the software is running.

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- R7000, R7100 ICOM
- Most ICOMs with 10.7MHz IF

Features

- Variable bandwidth, up to 10.7 MHz.
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- Signal Averaging. PLUS our exclusive "VARI-COLOR" Analysis.
- Variable Peak Readout.
- THREE different graphical analysis modes.
- Download our demo for test drive.

Minimum Requirements • IBM PC 8 meg ram • Windows 3.1 or later • 8 meg Hard Drive

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"The Standard Against Which All Future Decoders Will Be Compared"

Many radio amateurs and SWLs are puzzled! Just what are all those strange signals you can hear but not identify on the Short Wave Bands? A few of them such as CW, RTTY, Packet and AmTOR you'll know - but what about the many other signals?

There are some well known CW/RTTY Decoders but then there is CODE-3. It's up to you to make the choice, but it will be easy once you see CODE-3. CODE-3 has an exclusive auto-classification module that tells YOU what you're listening to AND automatically sets you up to start decoding. No other decoder can do this on ALL the modes listed below - and most more expensive decoders have no means of identifying ANY received signals! Why spend more money for other decoders with FEWER features? CODE-3 works on any IBM-compatible computer with MS-DOS with at least 640kb of RAM, and a CGA monitor. CODE-3 includes software, a complete audio to digital FSK converter with built-in 115V ac power supply, and a RS-232 cable, ready to use. CODE-3 is the most sophisticated decoder available for ANY amount of money.

26 Modes included in PROFESSIONAL package include:

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- AX25 Packet
- Facsimile all RPM (up to 16 gray shades at 1024 x 768 pixels)
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- DUP-ARQ Artrac
- Twinplex
- All modes in typical baud rates with possibility of changing to any desired value of speed and shift.
- User can save incoming data to disk in either ASCII or raw bit form.

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- TDM342/ARQ-M2/4
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- FEC-S • FEC1000 Simplex
- Sports info 300 baud ASCII
- Heilschreiber-Synch/Asynch
- Sitor - RAW (Normal Sitor but without Synch)
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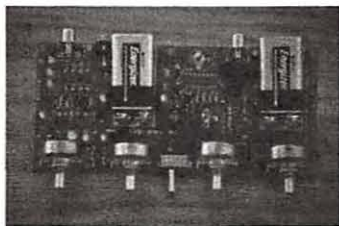
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The R30 comes with standard ceramic filters at a price of around \$495.95. With the optional Collins mechanical filter the price goes to \$595.95 — still \$100 less than the retail price quoted on the website. For additional information on pricing, availability, and final features, see Palstar's website or call 937-773-6255 (fax: 937-773-8003).

The OCR Receiver

There's a new meaning to OCR — which in usual parlance stands for "optical character recognition." Now you can add the "Optically Coupled Regenerative" Receiver for 40 meters, which is a kit available from Jade Products, Inc. A fiber-optics coupler in the front end allows smooth regeneration control, virtually no radiation, and excellent sensitivity, according to the developer.

The 6.6-inch by 3-inch circuit board has two integrated circuits (ICs), a voltage regulator, a field-effect transistor (FET), and an HP opto-coupler. Two 9 volt batteries (not included) power the entire receiver; one is used as bias for the front end and should practically last the shelf life of the battery. The other is the main power battery and draws 10 mA at high audio levels. The receiver obviously makes an ideal portable unit.



Assembly is easy, taking the average builder about 2.5 hours. The receiver has four controls: audio, fine tuning, main tuning, and regeneration control. There is an etch on the board to build a muting circuit for those builders that want to use the receiver with a transmitter.

The OCR receiver can be used for reception of single sideband (SSB), Morse code (CW), radioteletype (RTTY), and AM

modes through a tuning range of about 500 kHz at 7 MHz.

The OCR Kit is \$84.95 plus \$7 s/h from Jade Products at 800-JADEPRO (P.O. Box 368, East Hampstead, NH 03826-0368) or visit www.jadeprod.com/ for more information.

PC Radio

Ten-Tec has entered the ring with their small "black box" radio that runs on your computer. "Designed for two types of people: the PC user who has never listened to shortwave and the experienced listener who appreciates the powerful marriage of PC and the shortwave hobby," model RX-320 runs in the background while you do other tasks. A beginner's manual by Joe Carr helps get the first-time listener started.

PC Radio requires access to a serial port and one megabyte of free hard drive space, and runs on Windows 3.1 or Windows 95; the package includes a built-in telescoping whip antenna, though range will be significantly increased with an external wire antenna.

PC Radio accommodates AM, synchronous AM, upper and lower sideband, and CW modes; selectable filters include 6, 3, 2.5, 1.8 kHz or 500 Hz. IF frequencies are (1st) 45 MHz, (2nd) 455 kHz, (3rd) 12 kHz.

The software-based technology of digital signal processing enables sophisticated features at the very affordable price of \$295. For more information visit www.tentec.com or call Ten-Tec at 423-453-7172 or 800-833-7373.

All Band Anywhere

You don't have to leave your listening at home when you go on vacation or on a business trip. The Grundig Mini World 100 pocket radio gives you access to AM (no expanded band)/FM and six shortwave bands (5800-6400; 6900-7500; 9400-7500; 11650-12150; 15000-15650; 17500-18140 kHz). Features include telescoping antenna, AM ferrite antenna,

LED tuning, built-in speaker, and headphone jack.

The Mini World 100 is available for \$49.95 Canadian (about \$35 US) from the Authorized Grundig Store at S3555 Don Mills Rd., Suite 6-1715, North York, Ontario, Canada M2H 3N3, (416)467-4948 or visit their website at www.speedline.ca/grundig/home.html

Radio Amateur's Satellite Handbook



This all-new edition of Martin Davidoff, K2UBC's popular satellite reference is expanded, and includes extensive, illustrated chapters on analog and digital communications, antenna design and tracking, and all other aspects of satellite communications of interest to the experimenter.

A special section of appendices covers profiles of active satellites, computer programs, Internet sites, FCC rules and regulations, and even a comprehensive glossary of space terminology.

The Radio Amateur's Satellite Handbook is \$21.95 plus \$5.50 shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902; order toll-free by calling (800) 438-8155 or visit the Internet Web site at www.grove-ent.com.

Transmitter Documentation

If you want to know everything about all the shortwave broadcast transmitters installed all over the world, be sure to order a copy of the 5th edition of the TDP SW-98, the "Transmitter Documentation Project."

Ordering instructions for this informative booklet and TDP's numerous shortwave-related services can be found on their website at <http://www.ping.be/tdp.TDP>

SW-98 is \$10 (including shipping) in the US; write TDP, c/o Ludo Maes, P.O. Box 1, B-2310 Rijkvorsel, Belgium.



5 wpm Made Easy

If you want to make full use of the proposed restructuring of amateur radio classifications (see "Communications"), Brad's Software has released Morse Code Made Easy, a menu-driven learning tool that allows you to set your own pace when learning Morse code.

The three main modes are Lessons, Practice and Word List. You can switch between sound card and internal speaker, change the tone, words per minute, number of characters sent at a time, and whether the characters displayed as dits and dahs are sounded through the computer's sound system. The program tracks your progress and displays a score at the end of each lesson, based on level of difficulty.

Separate versions are available for DOS, Windows 3.1 and Windows 95. Morse Code Made Easy for Windows is available for \$25 plus \$4 s/h from Brad's Software, 4969 Wyoming Drive, Dallas, TX 75211-7843; (214) 339-6920. Email: brads_s@compuserve.com. You can download a free trial version of the software from http://ourworld.compuserve.com/homepages/brads_s/codedown.htm

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.

MFJ Giant Display 24/12 Hour Calendar Clock

By Skip Arey

When I first approached Rachel Baughn about doing this review, her response was "How much can you say about a clock?" Well as it turns out, the new MFJ-119 is not your everyday clock and it has quite a few features that make it the ideal timepiece for many monitoring posts.

Let's begin with the most salient point: This clock is BIG! The liquid crystal display (LCD) main time characters on the face of this 8-1/2 inch by 9 inch clock are a full 2-1/4 inches tall, making them easily visible across even a twenty foot room. Back in the digital early days, I built a light emitting diode (LED) clock with a readout of less than 1/4 inch, and costing well over \$75 — all for a clock that I had to squint to read!

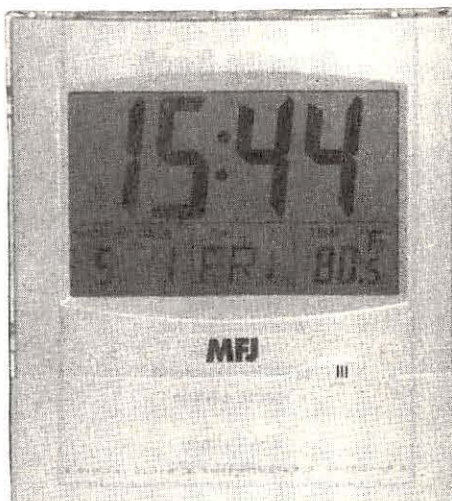
Well, I can even take off my bifocals and read the new MFJ-119. The size of the time readout alone is enough to make this clock an extremely practical item for any shack, but it has a few more features that I didn't have on my old home-brewed "squinty" clock.

Below the time readout we find three smaller, 3/4 inch readouts that list month and date, day, and temperature. The time can be set to read out in either the 12 hour or 24 hour format, so local time or UTC time are possible. Temperature can be switched with a touch of a button between Fahrenheit and Celsius readings.

The clock comes with excellent directions that I never really needed. All I had to do was pop in the two supplied AAA batteries and fiddle with the well-marked buttons on the back of the clock and I was up and running in less than five minutes. Just set it and forget it.

All you need do is find a nice place on the wall to hang it, using the mounting hole on the back. The readout appears to have slightly improved contrast when the unit is placed slightly above eye level, but that may be my bifocals kicking in. However, I have mine on a shelf as opposed to hanging it on the wall, for reasons I'll explain.

As mentioned earlier, the MFJ-119 is



controlled by a series of buttons and a switch on the back of the unit. One of these buttons allows you to change the temperature readout between Fahrenheit and Celsius with a single touch. Well, as a dedicated CW operator, it is common "rag chewing" practice in an international Morse code conversation to swap local weather conditions and temperature. Since we live in a world that goes by two different tempera-

ture recording systems, the MFJ-119 makes it very easy to give my local temperature in Fahrenheit or, with a touch of a button, in Celsius format for operators in most foreign countries. No more conversion formulas for the sake of keeping the conversation going.

Yes, I know this only works while I have the windows open: maybe the nice folks at MFJ will come up with an indoor/outdoor digital thermometer before the cold season sets in.

The clean lines and universally neutral color scheme of this clock make it a nice addition to 'most any room or office. A "professional" setup would be to have two units side by side — one set to UTC and Celsius and the other to local time and Fahrenheit.

The MFJ-119 Giant Clock is \$49.95 from MFJ Enterprises (PO Box 494, Mississippi State, MS 39762) at 800-647-1800 or on the web at www.mfjenterprises.com

P.S.: I've only had this clock around my shack for about a week now and I'm already spoiled. I need to tell the receiver manufacturers these 2-1/4" inch readouts are the way to go!

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Grove Enterprises offers liberal trade-in allowances for your used receiving equipment; we even buy it outright. Call us toll-free with a description of what you have; our operators will tell you what it's worth.

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GROVE

Orange Book of Scanner Repair

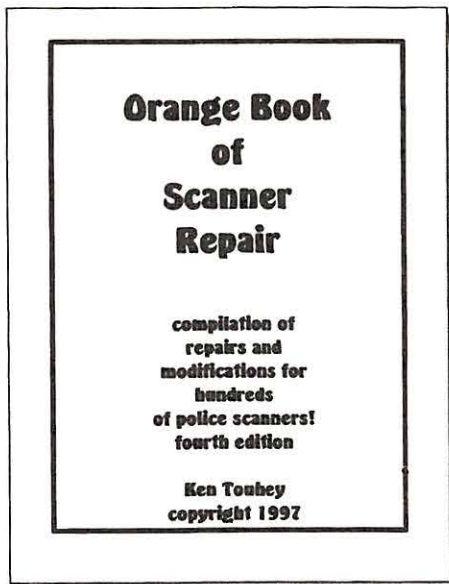
Getting the technical information required to repair scanners became more difficult this year with news that Uniden and Radio Shack are not going to sell schematics or service manuals for new scanner models. Though I cannot supply schematics or servicing data, this column will point you in the right direction if you are interested in finding the data needed to restore older scanners.

Service manuals for older Radio Shack models may be ordered through Tandy National Parts, telephone (800)442-2425 or (817)870-5600, or through your local Radio Shack store. Parts lists for recent and many older Radio Shack models are available on line at: http://support.tandy.com/support_electronics/2849.html Schematic diagrams and service manuals for some models may be obtained from Uniden/Bearcat's parts department, (800) 297-1023. It's more difficult to find information about the older Bearcat scanners made by Electra. The re-incorporated Electra Corporation (11915 E. Washington St., Cumberland, IN 46229, phone 317-894-3229) sells owner's manuals, but not service manuals.

Howard Sams Publishing division of Prentice-Hall publishes a 15 volume set of *Scanner-Monitor Servicing Data* books, known as the SD series. Each volume contains schematics and servicing information for a half dozen or more models, up through 1979. Sams publishes an annual index of service documentation, over 300 pages long. Contact Sams at 2647 Waterfront Parkway, East Drive, Indianapolis, IN 46214-2041, tel. (800)428-7267, or visit their web site <http://www.al.com/hwsams>.

David F. Norman's 250 page book, *VHF/UHF Fire, Police, Ham Scanners - Schematic/Servicing Manual*, is a great collection of schematics and parts placement diagrams for old crystal scanners. It was published by Tab Books (TAB Books, Blue Ridge Summit, PA 17294-0850) in June 1976 (ISBN 0-8306-5835-1) and is now out of print, but old copies often appear at hamfests.

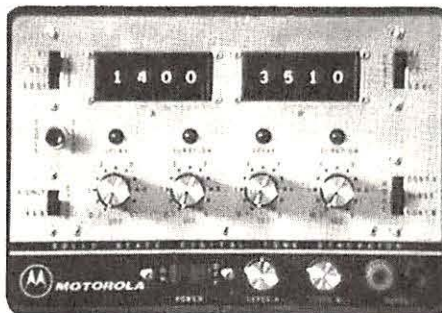
I use a 12-inch heat seal pouch laminator to protect my more valued schematics in 7 mil plastic. My laminator is made by Banner America (42381 Rio Nedo, Temecula, CA 92590, USA, tel. 800-572-2144, <http://>



www.inland.net/banner/mail.html), and is one of the handiest gifts I've ever received. It sells as model PL12A for under \$260 by The Lamination Station (837 Miramar Street, Cape Coral, FL USA 33904, 1-800-419-0247, <http://www.laminationstation.com>). Your local Kinkos or office supply store will also laminate documents for a couple of dollars per page.

■ Orange Book of Scanner Repair

Ken Touhey provided a 4th edition copy of his *Orange Book of Scanner Repair*. It is a 61 page compilation of Ken's servicing notes and modification information. The first 11 pages contain scanner repair advice applicable to several models. There are listings of the popular IF/squelch and audio amplifier ICs along with pin assignments.



The remainder of the *Orange Book* is a listing of scores of scanner models. Some models are listed with repair notes from customer radios, e.g., "Uniden Bearcat 800XLT: ... Distorted sound: C75 = 47uF 16V bad; use 220uF 25V. Also replace C73 = 47uF 10V with 47uF 25V..." Many models are listed for which there is no information provided, e.g., "Robyn 4000: SSD-14" which means repair information for the Robyn 4000 scanner may be found in Sams Scanner-Monitor Servicing Data volume SD-14.

This book is rough. It contains few diagrams and many of the notes are merely references to other books and modifications already published on the Internet.

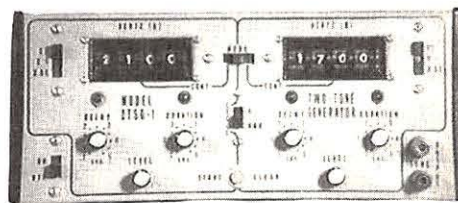
That said, there are valuable nuggets of information here that are difficult to find elsewhere — the kind of tips technicians share amongst themselves over a beer. It is best suited to electronics technicians and experimenters already familiar with electronics.

The *Orange Book* is available for \$25 plus \$3 shipping from Ken's Electronics, 2825 Lake Street Kalamazoo, MI 49001 (tel. (616) 345-4609, email ken@kenselectronics.com).

■ Tone Out Testing

In the 1970s and 80s, Motorola, AIE (Automated Industrial Electronics Corp.), Helper Instruments, and other companies sold digital tone generating test equipment designed to troubleshoot receiver tone squelch circuitry. I use tone generators to test CTCSS decoders and two-tone Plectron and Motorola Alert Monitor receivers. They can be used to test tone-controlled base stations and two-tone sequential pagers, as well. You can connect the tone generator to the tone decoder input inside the receiver or to the external modula-

Motorola, left, and AIE 2TSG-1, right, digital tone generators, \$20 hamfest bargains.





ICOM IC-R8500 and other receivers with SSB product detectors can be used to scan ASCB communications.

tion input jack of an RF signal generator.

Professional tone generators are now appearing at hamfests and electronics swapmeets. Shown are the Motorola S-1333A and AIE 2TSG-1 two-tone generators I bought at hamfests for \$20 each. The two models are so similar that AIE could have made the Motorola model, too.

Both generate stable tones from 10 Hz - 10 kHz. The tone frequencies are programmed by thumbwheel switches and the output level is adjustable via potentiometers. You can generate a single tone or a sequence of two tones. Tone duration and intertone delay are adjustable. You can even connect two or more generators in tandem to produce longer tone sequences.

■ Monitoring ACSB

Readers are already aware of trunking radio systems which employ narrowband FM (NFM) in the 400 and 800 MHz ranges. Did you know there's another type of trunking system in use nationwide which Uniden and Radio Shack trunk tracking scanners won't receive?

I'm talking about ACSB, which stands for amplitude companded sideband. If you have a VHF/UHF receiver with SSB capability (e.g., an ICOM IC-R8500, R7100, R7000, or AOR AR-5000), you can use the USB mode to monitor ACSB radio systems. I've monitored ACSB simplex transmissions before, and now there are new ACSB trunked systems in use in the Chicago area. Three SMR (specialized mobile radio) trunked business systems with transmitter sites in Chicago and Cook County suburbs can be heard 50 miles from the city.

Each trunked system consists of five repeater outputs in the 220 - 221 MHz range. Inputs are 1 MHz higher. These are narrowband, LTR (logic trunking radio) sys-

tems without a control channel. The signals are ACSB and the channel spacing is 5 kHz.

I use an IC-R8500 to monitor them, but tuning requires practice. Like other single sideband modes, tuning ACSB requires more precision than FM signals, which are intelligible even when mistuned a few kHz off frequency. I use a 10 Hz tuning step size and my R8500 displays frequencies about 1.75 kHz above the FCC assigned center frequencies.

Commercial ACSB transceivers, many made by SEA Inc. (7030 220th Street S.W., Mountlake Terrace, WA 98043, web page <http://www.sea-dmi.com>), use a pilot signal to automatically tune the receiver to the same frequency as the transmitter, akin to a hi-fi Automatic Fine Tuning Control. Unless you are using a real ACSB radio, an annoying warbling pilot tone is heard during transmissions.

This is an LTR-type trunking system and a short data burst can be heard every 10 seconds on each of the idle trunked channels.

Lest you think there's nothing to be heard but "boring" business communications, the FCC recently allocated 15 new frequency pairs in the 220 - 222 MHz band to public safety. The systems will be narrow band, as are the SMR trunked systems already licensed there.

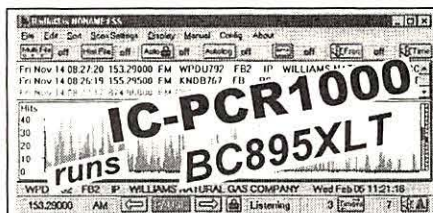
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AOR's AR5000+3 "DC-to-Daylight" Receiver

In the world of personal computers (PCs), there is a vigorous debate underway. One camp feels that the long-term norm will be the all-powerful PC which does everything—like what we've seen for some years, now. Another, newer, group forecasts that computer power will become balkanized, with each product having limited but specialized capabilities. These folks feel the do-it-all PC will fade into relative insignificance, much as have mainframes *vis-à-vis* PCs.

So it is with communications receivers, but in reverse. Until recently, if you wanted a tabletop shortwave receiver, you purchased a radio which could pick up shortwave, plus the bands lower down, such as mediumwave AM and longwave. If you wanted a receiver covering VHF, UHF and above, you got a scanner.

But with improved circuit design, it has become possible to manufacture receivers that can do it all, covering everything from VLF (very long wave) to the periphery of the light spectrum. Known as "DC-to-daylight receivers," these have gotten better over time, but have not lit any sales fires thus far.

The problem is not one of technology so much as cost. The requirements of a shortwave radio and a scanner are different enough that while much is common to both types of reception, some is not. In principle, synthesized design should help improve upon this, but thus far synthesized receivers themselves have been costly, which brings the issue full circle: How many folks are going to pay this kind of money for a radio receiver?

Compounding this are market realities. The vast majority of shortwave listeners are not interested in scanning, and many scanner buffs aren't interested in shortwave. This leaves a thin market for DC-to-daylight rigs—plus many of those who are interested in both shortwave and scanning seem to prefer separate units, notwithstanding the availability of all-coverage models.

■ Optional filter excruciating to install

Take AOR's latest do-it-all offering, the AR5000+3 ("Plus 3"). Unlike AOR's highly rated AR7030, it has been designed and manufactured in Japan. Suggested retail in the United States is \$2,895, although street price is expected to settle in around \$2,600, give or take. Our unit has an optional 6 kHz Collins mechanical filter, which adds \$150 to the price,

plus the \$140 AS5000 antenna selector. Bottom line, a three kilobuck receiver.

No surprise, that. What was unexpected was to find that the optional 6 kHz Collins filter was not installed at the factory. Instead, the user has to remove the standard ceramic filter and replace it with the Collins MF. The supplied instructions were wrong, and it took over two hours to complete for Rob Sherwood, of all people, who has done thousands of things like this over the years.

We notified AOR of the problem, and to their credit they revised the instructions in a matter of days. That's a big help, but even with these we don't recommend that anybody other than a thoroughly experienced electronics technician undertake this task.

More to the point: why, at this price, make people ante up \$150 for a filter that requires a Harry Houdini to install? For three Big Ones AOR ought to install the Collins MF as standard at the factory, period.

■ Many features included, but not all

The AR5000, in all versions, covers 10 kHz through 2600 MHz, with the appropriate "holes" in the version for the United States which, along with such enlightened societies as the Democratic People's Republic of Korea, forbids the public from tuning to certain frequencies.

There are all manner of tuning goodies, such as 2,000 presets that store just about everything but the operator's fingerprints, knob tuning, a small keypad (not in telephone format) for direct-frequency access and, of course, scanning. But there is no passband offset control, nor is there a tunable notch for heterodyne rejection. The World Time clock cannot be read while the frequency is being displayed.

Here, we look at the '5000+3 strictly as a non-scanner; that is, for receiving signals below 30 MHz. In the past, others at *MT* have reviewed the regular '5000 as a scanner (see Dec '96 "Scanner Equipment"), so we won't try to reinvent the wheel here. After all, except for additional presets, the enhancements in the +3 version are really for nonscanning reception.



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■ AFC works on shortwave

The new "+3" version adds synchronous AM reception, automatic frequency control (AFC) and a noise blanker to the feature roster of the standard AR5000—which, by the way, continues to be made available. Interestingly, whereas AFC circuits are normally only for FM, that on the '5000+3 also works on AM-mode signals. Few shortwave broadcast signals drift appreciably, but panelist George Zeller was pleased to find the '5000+3 nicely bird-dogging pirate Radio Metallica Worldwide as it drifted down the band.

■ Disappointing synchronous detector

Less fortunate is the performance of the synchronous detector. The good news is that it acts both as synchronous double sideband and synchronous selectable sideband, although its rejection of the unwanted sideband is not equal to that of many other models (on the '5000+3, manual "ECSS" tuning works better at adjacent-channel rejection).

The bad news is that it loses lock faster than my wife misplaces keys. The constant "brrrrp, brrrrp" as it loses, then tries to regain lock is so annoying that many will skip using this potentially useful feature altogether. We did.

■ Superb skirt selectivity; mediocre ultimate rejection and dynamic range

For shortwave listening and DXing, two voice bandwidths are offered: nominally 3 kHz and 6 kHz, both using ceramic filters. We installed the optional 6 kHz Collins mechanical filter, but not before measuring performance of the standard 6 kHz filter.

The standard filters measure 7.6 kHz and 2.7 kHz at -6 dB. The optional Collins wide filter measures a much better 6.0 kHz (5.95 kHz,

actually), but that's only half the story. The Collins filter and standard 2.7 kHz filter both have superb skirt selectivity, as well.

What about the standard wide (7.6 kHz) filter? Read on . . .

What really threw us for a loop was that, for an unprecedented second tabletop receiver in a row (see last month's review of the Japan Radio NRD-545), the ultimate rejection was 50 dB for the standard wide filter. This is so poor that skirt selectivity (-6/-60 dB) cannot be computed.

This is virtually unacceptable in any serious piece of hardware, but fortunately the ultimate improves to 60 dB with the Collins filter installed. Ultimate for the 2.7 kHz filter routinely measured 60 dB.

While -60 dB is acceptable, it is not the stuff of a serious communications receiver. The Drake R8B, for example, costs less than half the price of the '5000+3, and its ultimate rejection is 80 dB. Ultimates of 50 dB and 60 dB are what you expect from simple portables, not pricey supersets.

Still, for many—especially in such places as North America where signal strengths tend not to be great—60 dB can be acceptable. Fifty decibels is beyond the Pale, though, so the optional 6 kHz Collins filter, with its 60 dB ultimate, is strongly recommended.

Dynamic range also disappoints. Excessive phase noise makes it unmeasurable at the customary 5 kHz and 20 kHz separation points. But even at a relatively no-strain 50 kHz separation, where phase noise is less of a problem, the '5000+3 has dynamic range of only 58 dB and a third-order intercept point of -37 dBm—both poor.

Again, this is going to be a problem mainly in such parts of the world as Europe, North Africa and the Near East. In North America, particularly west of the East Coast—not to mention such weak-signal locales as Australia and Israel—ultimate rejection and dynamic range are nowhere as important.

■ Other measurements worthy

This is especially relevant with the '5000+3, because in other respects its shortwave performance is quite respectable. Its front-end selectivity and image rejection are both excellent, and second IF rejection is simply superb. Sensitivity with the preamp on is excellent, and almost as good with the preamp off. The related measurement of blocking is good.

AGC threshold and stability are also of a high caliber, although the noise blanker is only fair and is surprisingly complex to operate. Overall distortion in the AM mode is minimal, slightly higher but still worthy in the single-sideband mode, and good but higher yet with the synchronous detector in use. Withal, audio quality using the internal speaker is only okay, but it improves to pleasant with a suitable

external speaker.

■ Best receiver ever tested in two respects

The '5000+3 is unbeatable in two unusual areas: frequency readout accuracy and noise radiation. On most receivers, as you tune up or down the radio spectrum, a certain degree of inaccuracy shows up in the frequency readout. Not so the '5000+3, which on our unit reads out with absolute, unfailing accuracy to the nearest Hertz. WWV on 5000 kHz reads out 5000.000 kHz; on 10,000 kHz it's 10000.000 kHz, and so on. This is the Michael Jordan of receiver frequency readouts!

Broadcast band (mediumwave AM) DXers will also be pleased to find that the '5000+3 emits no detectable noise from its complex digital circuitry. This is the quietest radiator among all digital receivers we have tested, ever. What this means: longwave and mediumwave loop antennas won't pick up a single atom of noise from the '5000+3's whisper-quiet circuitry.

■ Poor ergonomics encumber operation

Dealers who carry the AOR AR7030, the '5000's sibling receiver, have been known to mutter darkly about the high return rate because people can't figure out how to operate it. Or, once they do, don't wish to put up with such hostile ergonomics.

While the '5000+3 isn't quite in this ergonomic cellar, its operation is exceptionally cumbersome. On the plus side, most functions of the receiver are adjustable. But as with the '7000, there are few conventional controls. Thus, most receiver functions are adjusted from

software menus which usually act upon instructions from the keypad. Added to this are default settings and other software specifics that are unhandy, inappropriate or both.

Helping overcome the various operating hurdles is an unusually thorough operating manual, which is "must" reading. Given its importance and complexity, an index would have been helpful, though.

The history of DC-to-daylight receivers reads pretty much the same. By and large, these rigs are VHF+ scanners that also pick up shortwave and below, rather than shortwave receivers that also happen to be scanners. The AR5000 fits into this pattern like a glove, although AOR has clearly tried to make the +3 a stronger contender as a shortwave receiver.

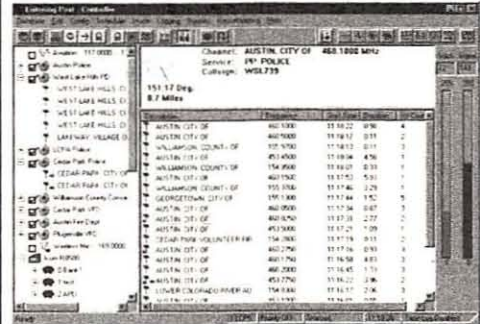
This is a receiver that ought to be purchased on a money-back basis, if only because the ergonomic framework is such that, while some will accept it, others won't.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

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Observing Cassiopeia - Hand PCs & Windows CE

or a minute, I bet you thought you were reading *Satellite Times*. I'm not talking about the constellation Cassiopeia, but the Hand Computer from Casio which runs Windows CE. We first spoke about this product after the Winter 98 Consumer Electronics Show (CES). But questions still lingered in my mind. Is it a toy, or a real computer? Can it run radio monitoring programs? And "Is it worth the money?" Hold your wallet closed while we try to answer these questions.

After a recent trip to Hong Kong one of these little babies is now at my disposal. The A-11A Super model comes with 6 megabytes of Random Access Memory (RAM) in a 7 x 3.5 inch case that's truly hand-held (Figure 1). It is powered by two alkaline AA batteries and a CR2032 lithium battery. The lithium is for data backup since the unit does not contain a hard drive. The AA battery life is typically 18 hours of continuous use, while the backup will last five years. But add a 33.4 kbs modem in the miniature PC card slot of the Cassiopeia, and the battery life tumbles to just a few hours. An AC adapter, rechargeable batteries and expansion port are also available.

■ Navigating in a small space

The display of the A-11A is a monochrome liquid crystal display which is backlit for low ambient light viewing. The display has a transparent, pressure sensitive, switch matrix overlay. This allows the user to invoke commands by touching the desired task with a pen-like stylus (included and stored in the front of the unit). Alternatively, if you have small fingers, you can use them on the screen in place of the stylus. The Cassiopeia can also be controlled via a miniature, but traditional, keyboard. Typing here is strictly "one finger."

■ Windows who?

Windows CE (consumer electronics) was developed by Microsoft for the appliance

market. It can even be found in car radios. It comes loaded in Read Only Memory (ROM) and its desktop screen looks very familiar to Windows 95 users. But what software will it run? Windows 3.1? Windows 95? Or neither? That was the biggest question in my mind. Another nagging question was, "How do I connect to the outside world?" The Cassiopeia's entire side was not much larger than a 9 pin serial connector. Traditional connectors were nowhere to be found.

Further inspection of the left side of the A-11A indicated a small flip-up door, which exposed a tiny connector. Casio provides a "tiny connector" to standard 9 pin serial cable. Flimsy, but adequate.

■ Light years, ahead or away

Also on the side is a dark red lens which may hold the future of data communications. This is Cassiopeia's IrDA port. IrDA, Infrared Data Association, is a group of major computer companies who have formed a consortium and produced a wireless data transmission standard using infrared beams. The first standard, IrDA version 1.0, has a range of 3 meters and a data rate of up to 117 kbs. Windows CE provides a quick and easy infrared (Ir) data port transfer program included on the Cassiopeia. The whole concept is very user friendly and makes portable computing easily transferable back to your desktop. As it turns out, this may be the only shining view of the future that we saw.

■ Lift off (maybe)

A number of standalone "applications" programs are preloaded into the Cassiopeia. These include Windows CE versions of Word, Excel, Microsoft's Internet Browser and Scheduler. But the empty folder labeled "My Programs" on the Cassiopeia



FIGURE 1: Casio's Hand PC Running Microsoft's Windows CE

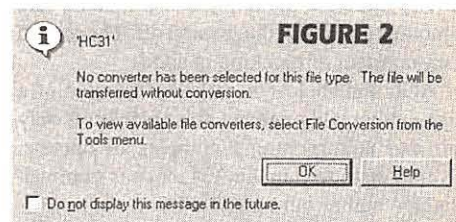
screen was just begging to be filled. This required loading CE Applications on my desktop Windows 95 Pentium via the included CDROM. A "Mobile Device" icon then appeared on the desktop computer's screen. Using this software, we can now connect the Cassiopeia to the desktop via their serial ports and transfer files and programs...maybe.

Sure enough, the Cassiopeia and the desktop started "talking" to each other. Starting slowly, I tried copying an Excel spreadsheet file from the desktop to the Cassiopeia. After a mystery screen announcing "Valid File Conversion" was displayed, the Excel file appeared on the Cassiopeia and loaded without problems into the CE Excel Spreadsheet. Great! Now let's try filling the My Programs folder with some radio-related software. Starting slow, let's try transferring a DOS based program, Ham Companion, that we have reviewed in a previous column.

■ Hey! What is that screen?

The instruction files, which are plain text files (.txt) transferred without a problem. Then it happened. When the main "HC.exe" file was attempted to be copied, the mystery screen again appeared, but it would not go away. Instead, it announced "No File Conversion Found" (Figure 2). What does it mean? Trouble.

The file was transferred from the desktop to the Cassiopeia. However, clicking on



The "Beginning of the End" Screen

it brings up a screen that I couldn't believe. It basically said that since HC.exe was not a Windows CE program it would be transferred, but would not run! Uh, oh. I quickly (and nervously) repeated the process with Windows 3.1 and 95 programs. The same message and no working program. Windows CE 2.00 does include a number of conversion tools. But these are primarily for text conversion. I'm still angry just thinking about the "experts" that had written all those glowing Hand PC articles.

■ Fooled again by a name

After reading and hearing all the hype about the wonderful Hand PCs and Windows CE, all I can say is, what garbage! Well people, we (I) have been fooled. This crop of Hand PCs are little more than a wordprocessor, spreadsheet and an internet e-mail retriever. That's it. Not quite a Hand Personal Computer. As for Windows CE 2.00, at best it is a misnomer. At worst ... WELL!

Windows CE 2.00 is not compatible with Windows 3.1, 95 nor 98. It cannot even run DOS programs. I tried in vain for a number of days. Reading the entire manual cover to cover I thought I was missing something. So I called Casio's Cassiopeia's Tech Services. They confirmed what should have been put in all the misleading advertisements and articles concerning Windows CE.

"Only Windows CE programs can be run. Essentially only the Word CE Wordprocessor, CE Excel Spreadsheet and CE Scheduler can be run," the Casio representative patiently replied. Thinking I must have misunderstood I said, "Windows 3.1 programs? Windows 95/98? DOS?" "No" to all, I was firmly told. With that, I slammed the phone down and thought about the hundreds of dollars I had wasted on the Hand PC consumer joke.

Yes, new Windows CE 2.00 programs are being written. But I was told by another industry source that it's at a rate of one per week. I hope radio software people take notice and join in. But for now, there are very few program applications that have been converted to CE. Without being downward compatible with anything, how could they name it Windows? By the time a useful

base of CE programs are available, the current Hand PCs will have as much value as a 80286 machine has today: almost nothing.

If you have to have the latest technical gadget to impress your friends and make you feel special then ... get a life, but don't get this, or any other Windows CE Hand Computer. In my opinion, at this time you are just throwing away money. Someday the Hand PC will be a reality. Just not yet. Perhaps Windows CE 2003 will be what its name implies. Just think of all those exciting publicity campaigns and product release fanfares that lie ahead. I can't wait.

■ Coming up

Next time, we'll go back in history to visit a restored missile site and get a complete tour of its communications, computer and radar vans. If you lived through the Cold War it will bring back memories. And even if you don't remember that period in history, the computer "technology" will shock you.

'Til next time, as the Romans cautioned, *Caveat Emptor*.



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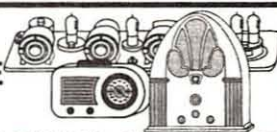
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LETTERS TO THE EDITOR

NEWS AND VIEWS FROM OUR READERS

Rachel Baughn, Editor

From the Editor's Desk

• Readers will note there's no Grove Buyer's Guide enclosed in this issue. No, your postal carrier has not taken a sudden interest in radios; just watch for the Grove Christmas catalog in your mailbox in late October instead of the insert, and as always, visit www.grove-ent.com for the latest on Grove products and publications.

• I'm very pleased to welcome Assistant Editor Larry Van Horn back to the pages of *MT* as editor of a new column on military communications: "MilCom." The column will be bi-monthly, alternating with John Fulford's "Fed File."

• We wish to acknowledge the legacy of John Bailey—our art director for the past several years, and the person responsible for the clean design and high standards the magazine has achieved. He's been producing covers for *Monitoring Times* for even longer, designing our earliest covers under the name "Owassa Graphics." John was recently forced to resign as art director when a major illness prevented him from doing the work he loves. But, as this month, he'll be keeping his hand in, still doing *MT* covers from time to time!

• I have some corrections from readers on items in the July "What's New" column: the website address for BayGen radios is now www.Freeplay.net. A reader tried to contact Cutting Edge Enterprises in Santa Cruz and was unable to find them; we have also been unable to locate the company which sold portable power supplies. If anyone has information, please let us know.

Colin Leath was interested in the SkyScan lightning detector, but when he called Equity Industries, they quoted a price of \$199.50 instead of the \$99.50 told us for "What's New." (Their website - www.eicsafety.com/order/index.html - quotes \$149.95!) Colin says, "I passed. It looked like a good unit. Maybe lightning detection or a built-in yourself detector might be a good subject for an article."

Read on, Colin ...

Home-brew storm tracking

In response to July's "Closing Comments" on alternate means of storm detection: "I have been using a home-brew lightning detector that works pretty well. Most

RF energy in a lightning stroke occurs in the ELF/VLF spectrum. I connect my 80-foot Windom to a series L-C network (500 mH/2000 pF), resonant at 5 kHz. This is fed to the input of a Radio Shack battery operated audio amp. I connect a VU meter to the external speaker jack, and adjust the gain for a -10 background noise reading, which is mostly power line hum.

"Lightning strokes produce sharp deflections. At a radius up to about 100 miles, storms produce spikes up to around -7. As they approach, they reach up to about -3 before I hear thunder. Local storms send the needle above 0 VU. There is no directivity to this, but that could be accomplished with a loop. It ain't radar, but it's something to watch."

—John H. Cobb, Jr., Roswell, GA

Bob Grove's reply: "Regarding the storm detector, that's certainly a cute idea. I wouldn't be surprised that a small active-antenna module could be made to sit on a desktop, hi-Q tuned to the ELF range to hear and display strokes.

"The NOAA Hurricane Center in Miami had (and possibly still has) a console with a giant, flashing neon bulb to visually register nearby lightning strokes. It was neat to watch, kinda like a Frankenstein movie!"

—Bob Grove

"By coincidence I also used TV for twister detection. The ones we have around the Phoenix area rotate too slowly and generally never touch down. During the span between 1950 and the present, half dozen were spotted on Channel 3. Until video cameras supplied funnels as proof, the typical official government attitude here was, 'No tornadoes form in this region, what you experienced was a straight wind.'

"My brother-in-law and I were watching Channel 3 news. It was late afternoon and suddenly broad bands of steady snow began obliterating the program, increasing until the channel faded into the background.

"I told my guest it indicated we have a tornado, probably between us and the transmitter 10 miles south. Being in his best redneck mode he delivered a put-down. Being certain it wouldn't do any damage we continued watching for a minute or so, then the screen changed back to TV showing a

short vortex dangling from the clouds. In resignation, he 'harrumphed' and we both ran out to watch the show. It was brief and soon vanished into the overcast. Several such funnels were an estimated 30 miles or more distant, but the broad bands of white screen persisted in most cases. Plenty of time to take cover.

"What bugs me is why this phenomenon hasn't been developed and put in general use. It has been known for almost half century and is available to all with TV. If I were younger, an attempt would be made to develop a simple circuit independent of TV, capable of sounding a raucous noise. Testing could prove a problem, unless a random noise generator is created to produce snow bands with their widths and durations also being random. Tuned between channel 2 and 3, a lot of lives could be saved."

—Will Rhodes, W7KLA, AZ

Sobering Numbers

JJBoone passed along (via email) the news that the American Short Wave Listeners Club (ASWLC) may be facing its demise. He reported that his membership check was returned and that a letter from general manager Stewart McKenzie indicated that there would be no more monthly bulletins [SWL], due to lack of operating funds. He opened up the floor to other remedies, but cited the fact that long time members were not renewing in sufficient enough numbers to justify the club's ongoing existence.

Boone asks, "Is this trend going to continue do you think? Are there no major clubs left? Can't SPEEDX and ASWLC merge, or something? Or have we old timers just gotten tired of fighting the fight and given in to the siren song of the Internet and (dare I say it) 'Scanning'? Has SWL listening gone the way of the CB radio? Fellow hobbyists, if we are going to continue, perhaps we'd better circle the wagons and come up with some solutions."

Though the recent proposal by the ARRL to significantly lower the CW requirement and simplify the license classes is a welcome one (see "Communications"), Robert Homuth makes a point no hobbyist should forget:

(Continued on page 94)

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LETTERS TO THE EDITOR

(Continued from page 92)

NEWS AND VIEWS FROM OUR READERS

"I do not share the view that 'Real hams work HF.' ... When the new Technician or Novice gets his or her first license, this operator is now a 'Real Ham.' Everything else is an optional bonus.

"No change in legislation or breakthrough in ham equipment can replace the elmer. If a new Technician wants to learn CW, the best way to drive him off is to say, 'I'm too busy to help you myself, but you *must* upgrade to be a *real* ham operator.'

"How about the CW fan who laments finding ragchewers, then in the same sentence gripes that too many poor operators with a bad fist annoy him?

"It's the same with scanning, SWL, satellite, FM-DX, and any other radio-related hobby. Treat *every* new ham, SWL, satellite DXer, FM DX hunter, fox-hunter, or other radio hobbyist as a valued friend and indi-

vidual.

"I'm bored with pseudo statistics that predict the 'end of radio in ten years' if nothing else changes. Radio changes by the minute."

—Robert Homuth, Phoenix, AZ

Great reception from HCJB

"Last June, during a trip to Colombia and Ecuador, I was privileged to visit and be the guest of HCJB there in Quito. What a tremendous experience! While there I observed the recording of Ken MacHarg's program "Saludos Amigos." He interviewed me on the show and it was a thrill to realize my voice went out to all the world by means of their powerful transmitters.

"Later, during a short term mission project in El Salvador, I listened on my

Grundig YB400 to the same broadcast! Ironically, *MT's* June issue included an article on HCJB, or I would have written up my visit and submitted it as an article.

"I was totally overwhelmed during my visit to Pifo, their transmitter and antenna site. Absolutely fantastic! It is such a shame that soon they will have to tear it all down and move it somewhere else because of the construction of the new airport. HCJB has done so much for the country of Ecuador through its hospital and other projects that it seems to me the government ought to help them with the expenses of the move and relocation."

—David Solliday, Wheat Ridge, CO

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By Bob Grove,
Publisher

Media Muddles

A recent manhunt in the mountains points out how *not* to start a tactical maneuver. "Well, we're going to be here Thursday with about 50 men; we'll begin a house-to-house search in the () community, then move on to ()," the spokesman for the investigative team said.

Talk about signaling your punches! Their game plan was aired by the radio stations and quoted in all the regional newspapers. Oddly enough, the culprit got away. Go figure.

As technology moves forward, another kind of muddle emerges as news reporters seem to get farther and farther behind. Admittedly, it's difficult to keep pace with progress, but it's quite another to ignore facts, mindlessly quote sources, and copy the uncorroborated reports of others. That's not journalism, that's lazy hacking.

Occasional errors are forgivable, but the more you know about a specialized subject like radio communications, the more you spot the pitfalls of ignorant reporting. A recent article from a western newspaper comes to mind. I'll spare them the embarrassment of being identified.

Reporting on the escapades of fugitives roaming a remote area, presumably armed with a scanner, the writer expressed his astonishment that, along with maps, bombs, survivalist instructions, and extremist propaganda, there was also a list of police frequencies. Apparently he has never visited the FCC Web site where these are available to anyone—no charge—nor is he aware of the assortment of CD-ROMs, *Police Call* and other scanner frequency directories, or the scanners that come preprogrammed with police (and other) frequencies!

The reporter went on to advise his readers just how easy it is to convert a (presumably hand-held) scanner to receive cellular channels: "Cut the lead on diode 502," he continued.

Only the discontinued Radio Shack models PRO2005 and PRO2006 (base/mobile models) had this diode fix; perhaps our intrepid writer envisioned the escapees dragging an enormous extension cord or carrying a car battery with them.

But communications ignorance didn't stop with the reporter; it continued with public safety officers. A SWAT team commander was quoted as saying that he expected every communication would be compromised because they didn't have scrambling. Now that's inexcusable.

If I didn't want anyone to know what I was up to, I'd simply say, "Alpha units, romeo four bravo." That could mean anything from "I'm going home before I fall asleep" to "Suspects are probably one mile ahead; watch the right side of the trail."

Competent teams have learned how to secure their communications without using scrambling. Local maps are divided into grids ("Alpha one," etc.); team members are issued tactical calls ("106"). The code list is retained by the members and may be changed at any time. Radio frequencies can be changed at prearranged, erratic intervals so as not to tip off anyone who might be listening in.

But perhaps the worst gaffe of all was suggesting that if the culprits had pocket satellite-tracking GPS units, they could monitor the keypad presses of their pursuers to find out where they were!

I *really* don't think so.

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-OST, 4/97

– *Monitoring Times*, 1/97

– *Passport to World Band Radio*, 1998

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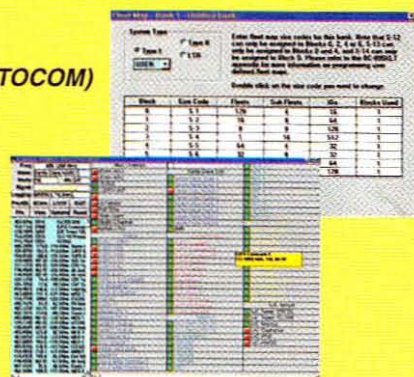


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